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**FURTHER STUDIES ON THE IMPORTANCE OF  
MILK AND MILK PRODUCTS AS A FACTOR IN  
THE CAUSATION OF OUTBREAKS OF DISEASE  
IN THE UNITED STATES**

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THE IMPORTANCE OF  
THE PREVENTION OF DISEASE  
IN THE UNITED STATES  
AND THE PROGRESS AS A FACTOR IN  
THE RISE OF THE NATION

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## FURTHER STUDIES ON THE IMPORTANCE OF MILK AND MILK PRODUCTS AS A FACTOR IN THE CAUSATION OF OUTBREAKS OF DISEASE IN THE UNITED STATES

By CHAS. ARMSTRONG, *Surgeon*, and THOMAS PARRAN, Jr., *Surgeon, United States Public Health Service*

### INTRODUCTION

The occurrence of milk-borne outbreaks of disease is a well-recognized fact, the importance of which is indicated in the compilations of milk-borne outbreaks reported by Busey and Kober (1895), Baker (1896), Freeman (1896), Hart (1897), Caroe (1898), Schleghtendal (1900), and Trask (1909). These authors report over 700 milk-borne outbreaks of disease, of which 179 occurred in the United States.

In this report there are presented 612 additional instances in which infected milk or milk products have been instrumental in producing outbreaks of greater or less extent in this country.<sup>1</sup>

The outbreaks herein reported may be considered as a continuation of the compilations begun by Trask and earlier authors and represent an effort to complete the data for the United States as published up to January 1, 1927. This investigation has been confined to the United States, because the habit of consuming uncooked milk or its products is more common here than in most other countries, and because the available data on foreign countries were in many instances obviously incomplete. The milk-borne outbreaks reported here have been collected wholly from the literature; and while the list could undoubtedly have been extended had the various State, city, and county health officials of the country been circularized, this was not done. It was felt that such a procedure, covering a period of 19 years, would still give incomplete data, and it seems probable, moreover, that the most important and better proved milk-borne outbreaks have been recorded in the literature. Many of the outbreaks are, however, so incompletely described that it has been impossible for the writers to exercise an independent judgment as to whether or not the infection was milk borne. We have, therefore, accepted the conclusions of the investigators on this point. When

<sup>1</sup> This summary includes 65 milk-borne outbreaks recorded for Massachusetts, 1906-1915 by the special milk board (1916) of the State Department of Health of Massachusetts, and 28 for the same State, 1916-1920, compiled by Kelley and Osborne (1920), and 15 compiled by Kelley and Webber 1920-1923 (1924), also 17 recorded for Illinois, 1913-1923, by Nauss (1923).

the description was so incomplete as to location, time, circumstances, etc., as to leave the identity of the outbreak doubtful, or when the investigator has expressed doubt as to the cause of an outbreak, using such terms as "possibly milk borne," etc., it has not been included in this summary.

#### MILK AND THE COMMUNICABLE DISEASES

Milk-borne outbreaks to the number of 791 have been collected for this country by Freeman, Baker, Busey and Kober, Trask, and the writers. It is, however, impossible to state just what proportion of the total number of milk-borne outbreaks are represented in these summaries, but certainly not all of them. Many escape detection through lack of study, and some studied are not described in the literature; moreover, it is probable that of those published not all have been located. The greater frequency of recorded milk-borne outbreaks in recent years is a reflection of the greater care with which the preventable diseases have been studied.<sup>2</sup>

This increase for the United States was gradual and consistent from 1881 to 1914, during which year 55 outbreaks (all types) were recorded. Following 1914 there was a rather sudden reduction in the reported number of outbreaks to 42 in 1915; 26 in 1916; 23 in 1917; 19 in 1918, and 8 in 1919. An increase to 25, 28, 19, 19, and 28 occurred in 1920, 1921, 1922, 1923, and 1924, respectively. The reports for 1925 and 1926 are probably incomplete, due to the lag in reporting. For outbreaks by five-year periods, 1881-1923, see Table 1 and chart 1.

TABLE 1.—Recorded milk-borne outbreaks (all types) in the United States by five-year periods, January 1, 1881, to January 1, 1927

Years	Outbreaks	Years	Outbreaks
1881-1885.....	3	1911-1915.....	238
1886-1890.....	14	1916-1920.....	130
1891-1895.....	26	1921-1925.....	130
1896-1900.....	33	1926.....	12
1901-1905.....	60	Total.....	791
1906-1910.....	145		

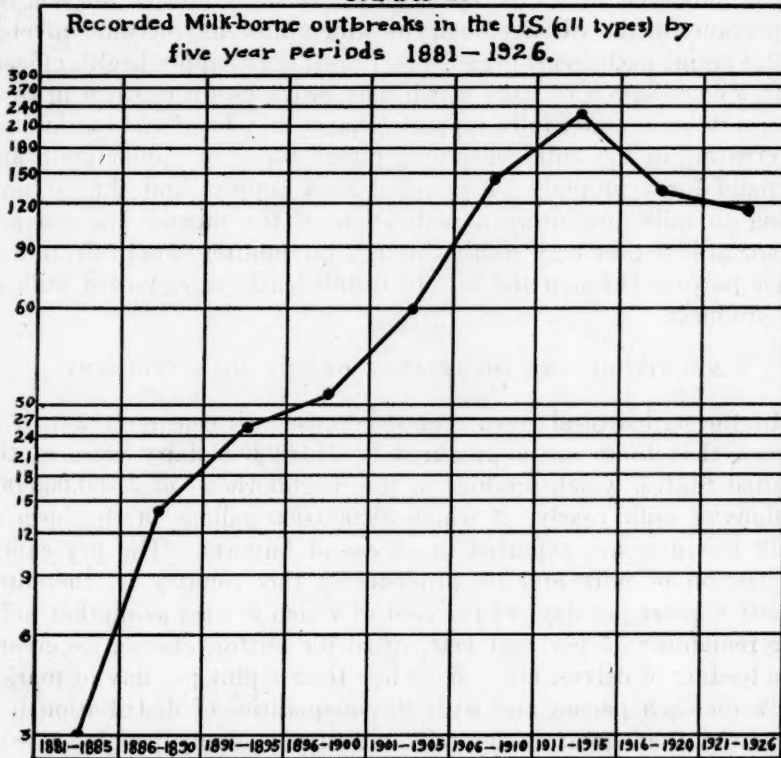
The decrease since 1914 is probably due, in part at least, to improvement in the quality of our milk supply.

It should be noted that at no time, even in our most progressive States, have sufficiently extensive studies of the sporadic cases of typhoid fever, scarlet fever, diphtheria, etc., been made to enable us to draw any conclusions as to the importance of milk in their causation.

<sup>2</sup> It is to be noted that in the presence of a good water supply, such as most cities now enjoy, the detection of milk-borne outbreaks of typhoid fever is much simpler than when they occurred in cities having a high typhoid rate due to a contaminated public water supply.

Neither do these compilations take any note of bovine tuberculosis, which occurs sporadically in children and which is largely milk borne, or of the occurrence of infantile diarrhoea, which is at least in part due to improperly produced or improperly handled milk. Moreover, the occurrence of cases and deaths as recorded in the outbreaks herein summarized are obviously incomplete, since they represent, in most cases, the number found at the time of the investigation and largely neglect those occurring later, while in some outbreaks no figures are given for either cases or deaths.

**CHART 1.**



It is therefore apparent that such a study as is attempted is not an accurate criterion of the importance of milk as a carrier of infection and must be considered simply as a minimal estimation of the occurrence of milk-borne diseases.

#### PURPOSE OF THE STUDY

Milk as a factor of health demands the attention of the health officer in two important regards: He must consider the question of a supply of sufficient quantity as well as one of adequate quality.

In the publication of this collection of milk-borne outbreaks which have occurred in the United States during the past 19 years, there is no desire to overestimate the relative importance of milk as a carrier of disease. Milk is the one article of our diet produced in nature solely for the purpose of serving as a food. It is especially adapted to the needs of the young and growing individual, and has come to be looked upon as the ideal food from the standpoint of completeness, digestibility, and cost. Any teaching which might curtail the consumption of milk or its products, of a quality such as is now enjoyed in this country, would result in more injury than benefit. It is hoped, however, that this report may furnish an idea of the relative importance of the various means by which milk may become infected with various pathogenic organisms; that it may supply health officers with a compilation of facts which may prove useful to them in their efforts to secure safer milk supplies; that it may be of some assistance in creating in the milk-consuming public a proper appreciation and demand for a properly safeguarded milk supply; and that it may bring to milk producers a realization of the mental anguish and financial loss that may result through the unintentional infection of their patrons through the sale of insufficiently safeguarded milk or its products.

#### MAGNITUDE AND IMPORTANCE OF THE MILK INDUSTRY

In the agricultural reports of the fourteenth census (1920), it is shown that there are approximately 21,000,000 dairy cows in the United States, which produce in the neighborhood of 7,800,000,000 gallons of milk yearly, of which 38,000,000 gallons in the form of milk products are exported in excess of imports. The per capita utilization of milk and its products in this country is, therefore, about 1 quart per day, 45 per cent of which is used as market milk, the remaining 55 per cent being used for butter, cheese, ice cream, the feeding of calves, etc. With less than 1 pint per day of market milk for each person and with the inequalities of distribution it is apparent that, great as our milk industry is, many people are consuming less milk than is desirable.

When we consider the magnitude of the milk industry and the value of its product to the public, this considerable collection of milk-borne illnesses herein reported shrinks in comparison and offers no adequate grounds for advising any general curtailment in the use of milk and its products. Yet the occurrence of milk-borne diseases is a challenge to health authorities, milk producers, and milk handlers, and demands correction.

## SAFEGUARDING OUR MILK SUPPLY

With the growth in our milk industry, with its complicated methods of collection, shipping, and distribution, the difficulty of properly controlling the quality of the market article has greatly increased. Milk is subject to infection from the time before it leaves the cow to the time of its consumption, and when once infected it is an excellent culture medium for the growth of many kinds of bacteria.

In 1912 the American Association of Medical Milk Commissioners laid down 97 different rules and regulations which represented in its opinion minimal requirements for the production of a raw milk sufficiently safeguarded to be sold as "certified milk." When we consider milk derived from 21,000,000 cows scattered over the whole of the United States on some 4,500,000 farms and handled by many millions of people the impossibility of securing an adequate supply of properly safeguarded *raw* milk at a price within reach of the masses is evident. The solution of the problem in the minds of most sanitarians lies in surrounding milk production with all practicable safeguards and then adding the additional and essential safeguard of *adequate Pasteurization in machines of proper and approved design properly operated and controlled*. The Pasteurized product should be promptly cooled, put into sterilized containers, capped without the use of human hands, and promptly delivered to the consumer. Boiling in the home constitutes the last word in furnishing the family a supply safe from infection.

## CHARACTERISTICS OF MILK-BORNE OUTBREAKS

The characteristics upon which a diagnosis of a milk-borne outbreak is usually made are well known and will not be discussed beyond mentioning the factors usually considered:

1. The outbreak is often explosive in onset—but not always so.
2. The percentage of cases on the incriminated milk supply is greater than the percentage of population using that supply.
3. Cases occur among users of milk, ice cream, etc.; therefore children, women, and well-to-do families often suffer higher attack rates than men and persons in poorer families.
4. Multiple simultaneous cases often occur in the same household.
5. The incubation periods may be shortened.
6. When the infected milk supply is stopped, the outbreak subsides.

To these might be added a greater frequency of milk-borne outbreaks at definite periods of the year, depending upon the disease.

## TYPHOID FEVER

Typhoid-fever outbreaks due to milk have been reported in the United States to January 1, 1927, as follows:

Reported by—	Number of outbreaks
Busey and Kober.....	20
Baker.....	4
Freeman.....	3
Trask.....	107
Armstrong and Parran.....	479
Total.....	613

The geographical distribution of the outbreaks collected by Armstrong and Parran is shown in Table 2, which also contains a summary of the recorded cases and deaths for each State.

TABLE 2.—Milk-borne typhoid fever outbreaks by States, with number of recorded cases and deaths, 1907-1926

State	Number of outbreaks	Number of cases (incomplete)	Number of deaths (incomplete)	State	Number of outbreaks	Number of cases (incomplete)	Number of deaths (incomplete)
Alabama.....	1	451	-----	Nevada.....	2	28	-----
Arkansas.....	1	321	-----	New Hampshire.....	2	36	-----
Arkansas-Texas.....	1	34	1	New Jersey.....	22	539	11
California.....	14	364	3	New Mexico.....	2	74	-----
Colorado.....	2	93	6	New York.....	63	2,136	9
Connecticut.....	19	349	3	Ohio.....	29	926	23
District of Columbia.....	5	151	11	Oklahoma.....	1	16	3
Georgia.....	1	9	-----	Oregon.....	2	52	5
Illinois.....	45	1,303	13	Pennsylvania.....	55	2,104	24
Indiana.....	11	430	5	Rhode Island.....	11	372	14
Iowa.....	11	253	5	Tennessee.....	5	197	8
Kansas.....	10	78	1	Utah.....	2	56	-----
Kentucky.....	1	26	-----	Vermont.....	5	80	-----
Maine.....	4	55	4	Virginia.....	12	246	3
Maryland.....	14	368	15	West Virginia.....	3	25	1
Massachusetts.....	82	2,878	13	Wisconsin.....	4	5	-----
Michigan.....	15	425	16	Hotel on Gulf of Mexico <sup>1</sup> .....	1	10	-----
Minnesota.....	9	165	8	Washington.....	6	148	8
Mississippi.....	1	35	-----	Total.....	479	14,968	219
Missouri.....	3	82	3				
Montana.....	1	38	8				
Nebraska.....	1	10	-----				

<sup>1</sup> Exact location not known.

The distribution of outbreaks by month of onset is shown in Table 3.

TABLE 3.—*Distribution of outbreaks of typhoid fever by month of onset*

Month	Armstrong and Parran	Busey and Kober, Baker, Freeman, Trask	Total, 1881-1926	Month	Armstrong and Parran	Busey and Kober, Baker, Freeman, Trask	Total, 1881-1926
January.....	15	9	24	November.....	18	10	28
February.....	12	3	14	December.....	14	2	16
March.....	17	4	21	Total, month given.....	367	121	488
April.....	16	9	25	Month of onset not given.....	112	13	125
May.....	26	4	30	Total.....	479	134	613
June.....	17	5	22				
July.....	57	11	68				
August.....	73	21	94				
September.....	73	24	97				
October.....	29	19	48				

The greater incidence of typhoid-fever cases so frequently noted in many places during August and September naturally affords potential foci for the occasional infection of milk. Additional factors probably tending to cause an increase in milk-borne outbreaks during August and September may be noted as follows:

During the busy summer months many dairymen find it necessary to employ additional help on the farm and, as a matter of chance, it occasionally happens that a typhoid carrier is so employed. In several of the outbreaks here recorded the origin of the epidemic was traced to a temporarily employed carrier. No person should be employed on the dairy unless known *not* to be a carrier.

That many typhoid carriers have typhoid bacilli in their stools at intervals only, is a well-known fact, and it may be that the carrier state is more common during the hot months of July, August, and September when bowel disturbances are more common.

Flies are most numerous during the summer months, and they have been noted in many outbreaks as a possible means of conveying the infection to the milk. The fact that cows are at large during the summer and have waded in polluted streams has been mentioned as a possible source of infection in a few outbreaks.

Moreover, when the infection of the milk has once occurred, the greater difficulty of maintaining the milk at a low temperature in hot weather permits a more ready multiplication of the usual small initial contamination. This fact is thought to have been important in explaining a localized outbreak at the State College, Pullman, Wash., in 1922, where 60 cases of typhoid developed among students at one boarding house. The same milk supply was delivered to two other boarding houses which, however, escaped the infection. Investigation disclosed that the latter two boarding houses kept their milk properly iced, while at the affected house the milk stood at room temperature.

*The infected product.*—In 479 typhoid outbreaks here reported, milk was considered to be the medium of infection in 444, ice cream in 32, butter in 2, and cheese in 1 outbreak each.

The incriminated milk supply was described as raw in 133 outbreaks, as Pasteurized in 21, and as certified in none. However, it is to be noted that in 290 of the typhoid epidemics the original reports fail to describe the character of the incriminated milk; but as many of them were from small supplies, it would seem probable that they were largely due to ordinary raw milk.

Among 29 outbreaks which are reported to have followed the use of "Pasteurized" supplies (milk or ice cream), there were 12 outbreaks in which the evidence pointed to infection of the milk subsequent to Pasteurization; in three outbreaks a possible substitution of raw milk could not be ruled out; and in three others there was evidence that the heating was not to the specified degree. In two outbreaks the so-called Pasteurization consisted in heating the milk in a starter can. In one outbreak the equipment was described as obviously faulty. Of the remaining eight outbreaks one followed the flash method while in seven either the method of Pasteurization or the source of infection was not stated.

That proper Pasteurization of infected milk does prevent infection has been indicated in a number of instances in connection with the study of milk-borne outbreaks. A family in a northern county of Illinois with four cases of typhoid fever sold milk to three neighbors, all of whom developed the disease. The same milk was shipped to Chicago, where it was Pasteurized, and no cases are known to have resulted (1921). In an outbreak at Richmond, Calif., in 1915, described by Geiger and Kelley (1916), 12 cases occurred on a route selling 90 gallons of milk daily. During this same time this dairy shipped 600 gallons daily to Berkeley, where it was Pasteurized, and no typhoid occurred.

Similar examples of part of an infected supply being rendered harmless through Pasteurization are noted in the outbreaks at St. Charles Township, Kane County, Ill., 1921, in central New York State, 1922, and at Denver, Colo., 1926.

*Source of infection.*—In 373 outbreaks of typhoid fever for which the means of milk infection was designated, the following proved or probable sources of infection have been mentioned:—

<i>Probable sources of infection</i>	<i>Number of outbreaks</i>
Carrier (farm, distributing plant, etc.).....	162
Active case (farm, distributing plant, etc.).....	134
Exchange of bottles from homes with infection.....	37
Use of polluted water on utensils, etc.....	28
Soilage of cows in polluted water.....	4
Miscellaneous (intermediate persons, etc.).....	8

*The carrier and milk-borne typhoid fever.*—The typhoid carrier, as shown above, is the most important single source of typhoid infection for milk. The carrier state is best prevented by averting the original attack of typhoid fever. When once it is established, however, cure is extremely difficult, and, in view of the long period over which bacilli may be continuously or intermittently excreted, the control of the carrier becomes a difficult problem for which no completely satisfactory solution has yet been secured.

It is obviously desirable that typhoid carriers be prevented from handling milk; but in relatively few places do the regulations prescribe an examination of all milk handlers for the carrier state. Too often the milk handler is discovered only after a disastrous milk-borne outbreak has indicated his location. In the routine search for carriers the history is of importance, and every person who has had typhoid fever should be considered and should consider himself a carrier until proved otherwise. Not all carriers, however, give a history of the disease, due in some cases to obviously mistaken diagnoses, while in others, as in outbreaks 172, 292, 305, 382, 427, 441 (final tables), proved carriers have denied having had typhoid or prolonged fever.

The positive Widal reaction has proved itself of great value in the location of possible carriers, but when found the condition must be confirmed by bacteriological tests.

In the bacteriological search for carriers, a negative finding, to be conclusive, must have been frequently repeated over long intervals of time and must involve a study of both urine and feces. In 32 outbreaks for which the information was recorded there were 28 fecal carriers, three urinary carriers, and in two cases the specific organisms were recovered from both bowel and urinary discharges. The duration of the carrier state (years from date of typhoid attack to time of causing outbreak) in 41 outbreaks where this information was secured was as follows:

Under 1 year.....	10
2 to 10 years.....	13
11 to 20 years.....	8
21 to 30 years.....	5
31 to 40 years.....	1
41 to 50 years.....	3
51 to 60 years.....	1

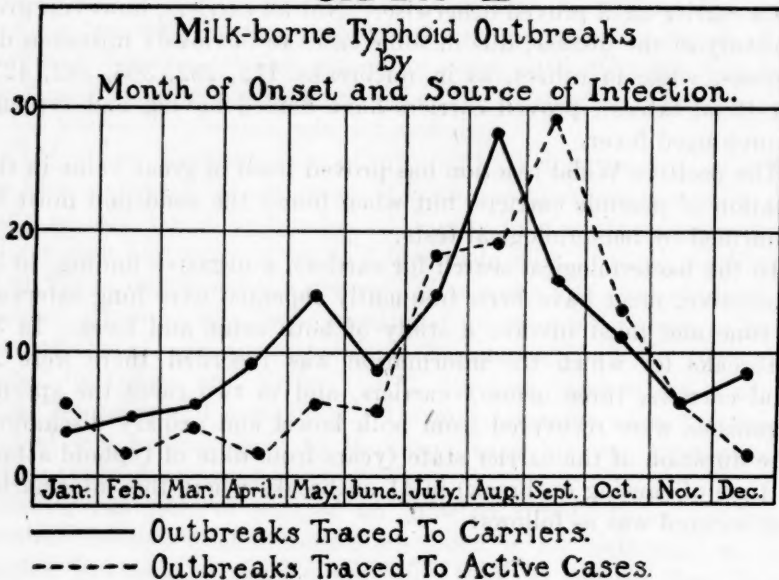
It is of interest to note that in 127 outbreaks traced to carriers and 112 traced to active cases the peak month for onset in the carrier outbreaks was August, while in the outbreaks traced to the infection of milk from active cases it was one month later. (See Table 4 and Chart 2.)

TABLE 4.—Milk-borne typhoid outbreaks by month of onset and source of infection

Month	Traced to carrier	Traced to active case	Month	Traced to carrier	Traced to active case
January.....	4	6	August.....	27	19
February.....	5	2	September.....	15	29
March.....	6	5	October.....	11	13
April.....	9	2	November.....	6	5
May.....	14	6	December.....	8	2
June.....	8	5			
July.....	14	18		127	112

This may indicate that carriers are responsible for a portion of the active cases which, in turn, infect the milk, or that the precautions taken in the presence of an active case delay in a measure the time of infection of the milk.

## CHART 2



*The active case and milk-borne typhoid fever.*—Active cases among milk producers or distributors have been noted as a probable source of infection of the milk in 134 of the epidemics listed. Such a record emphasizes the importance of early report and investigation of all illness in milk handlers, and some of our health departments make the investigation of all such reported cases a routine measure.

Aside from the immediate value of such a procedure in preventing or lessening the extent of a milk-borne outbreak, such investigation offers an opportunity for the inspector to impress the lesson of milk sanitation where most needed and under circumstances most likely to leave a lasting impression.

*The exchange of infected bottles.*—Bottles from homes with infection have been incriminated in 37 of the outbreaks of typhoid fever reported herein. Such occurrences should be prevented by stopping the entrance or removal of bottles to or from infected homes and by thorough sterilization of all bottles prior to refilling. Milk-bottle infection is likely to produce scattered cases on a route with the absence of the customary explosive features, and where an exchange of bottles among milkmen takes place the development of cases on several routes may occur. Such occurrences greatly enhance the difficulty of determining the milk-borne nature of an outbreak.

The danger of the spread of typhoid fever by means of infected water used in the cleaning of utensils is apparent and scarcely needs special mention.

A detailed summary of the 479 epidemics collected by the writers with references, etc., is contained in Table 10.<sup>3</sup>

#### PARATYPHOID FEVER

Seven outbreaks of paratyphoid fever are herein reported, three due to infected raw milk, two to pasteurized, one to certified milk, and one to ice cream. There are recorded 434 cases and 15 deaths (data incomplete). Two outbreaks were traced to active cases on supply farms, three to a carrier, and in one the origin was undetermined. In all essential epidemiological features, milk-borne paratyphoid fever behaves like typhoid fever. A detailed summary of outbreaks of paratyphoid fever with references, etc., will be found in Table 11.

#### DYSENTERY AND DIARRHEA

Six outbreaks of dysentery and diarrhea have been reported. Three were due to raw milk and in three outbreaks the character of the supply was not stated. There were 92 cases and five deaths attributed to these outbreaks, the origin of which was credited in three instances to active cases on the supply farm, while in three the origin was not mentioned. Table 12 contains a detailed summary of outbreaks of dysentery and diarrhea.

#### SEPTIC SORE THROAT

Epidemics of septic sore throat are probably always milk borne. There have been collected by the writers 42 outbreaks of this disease which, in the point of numbers affected, has been the most common milk-borne ailment recorded during the past 19 years. There are herein noted 21,045 cases with 139 deaths (data incomplete). The geographical distribution of these cases is given in Table 5.

<sup>3</sup> Tables 10-16, inclusive, giving detailed summaries of the data collected, will be found in the appendix.

TABLE 5.—*Milk-borne epidemics of septic sore throat*

State	Number of outbreaks	Number of cases (incomplete)	Number of deaths (incomplete)	State	Number of outbreaks	Number of cases (incomplete)	Number of deaths (incomplete)
Connecticut.....	4	789	5	Oregon.....	1	487	22
Illinois.....	3	10,630	19	Pennsylvania.....	1		
Maryland.....	1	2,000	16	Vermont.....	2	1,260	1
Massachusetts.....	20	3,716	61	Wisconsin.....	1	325	
New Hampshire.....	1	1,000		Total.....	42	21,045	139
New York.....	7	1,368	15				
Ohio.....	1	70					

Raw milk was responsible for 19 outbreaks, Pasteurized milk for 3, certified milk for 1, and ice cream for 1, while in the remaining 18 epidemics the character of the milk supply was not stated. The sources of infection were noted as follows:

Cases on farm.....	16
Mastitis in cows.....	3
Cases on farm and mastitis in cows.....	9
Carriers on farm.....	2
Undetermined.....	12

For distribution of outbreaks by months see Table 6 and for a more detailed summary see Table 13.

TABLE 6.—*Reported outbreaks of milk-borne septic sore throat, scarlet fever, and diphtheria for the United States, January, 1881, to January 1, 1927, by month of onset*

Month	Septic sore throat		Scarlet fever			Diphtheria			All combined
	Herein compiled	Previously compiled	Herein compiled	Previously compiled	Total	Herein reported	Previously reported	Total	
January.....	4	0	5	2	7	1	0	1	12
February.....	8	0	2	5	7	1	0	1	16
March.....	2	0	0	2	2	1	1	2	6
April.....	7	0	9	1	10	4	1	5	22
May.....	6	0	6	2	8	4	2	6	20
June.....	3	0	0	2	2	1	3	4	9
July.....	4	0	3	0	3	3	2	5	12
August.....	2	0	0	2	2	1	1	2	6
September.....	2	0	1	1	2	2	2	4	8
October.....	1	0	2	1	3	2	2	3	8
November.....	0	0	0	1	1	1	1	2	3
December.....	1	0	4	3	7	1	0	1	9
Unknown.....	2	0	8	3	11	4	3	7	20
Total.....	42	0	40	25	65	26	18	43	151

## SCARLET FEVER

There are herein reported 40 milk-borne outbreaks of scarlet fever with a total of 3,939 cases and 20 deaths (data incomplete). The geographical distribution is shown in Table 7.

TABLE 7.—*Milk-borne outbreaks of scarlet fever by States*

State	Number of epidemics	Number of cases	Number of deaths	State	Number of epidemics	Number of cases	Number of deaths
Connecticut.....	2	147	-----	New York.....	7	314	17
Illinois.....	2	551	-----	Ohio.....	3	193	-----
Massachusetts.....	16	2,302	-----	Pennsylvania.....	2	28	-----
Michigan.....	2	196	3	Rhode Island.....	1	29	-----
Minnesota.....	1	45	-----	Total.....	40	3,939	20
Montana.....	1	55	-----				
New Jersey.....	3	79	-----				

Raw milk was held responsible in eight outbreaks, Pasteurized milk in two, and ice cream in one, while in the remaining 29 outbreaks the character of the incriminated milk was not stated, but in most of them the milk was presumably ordinary raw milk.

The distribution of outbreaks by month of onset is given in Table 6.

*Age distribution in milk-borne scarlet fever.*—In 1903 Sir Henry Littlejohn noted a high adult incidence in milk-borne scarlet fever in Scotland and this reversal of age grouping has been utilized by Clarke (1924), for the purpose of diagnosing milk-borne scarlet fever. He has taken the dividing line between juvenile and adult cases to be the fourteenth year. In ordinary scarlet fever as observed at the Edinburgh Hospital, 1908, the ratio of juvenile to adult cases was 48:1 while in milk-borne outbreaks the ratio approached 1:1. By means of age tables Clarke was able to diagnose milk-borne outbreaks and later confirm the diagnosis by ordinary epidemiological means. Ker suggests that this reversal of age incidence is related to the habit in Scotland of adults taking raw milk on porridge and sweets. Age reversal has not been stressed in this country except in typhoid fever where the proportion of cases in the earlier years of life is increased. Godfrey, however, has noted it in some outbreaks in New York for both scarlet fever and diphtheria and states that there was no peculiarity of age distribution among exposures to account for it. Ramsey reports an outbreak of scarlet fever in Michigan, 1924, traced to ice cream in which a high percentage of adults was attacked. At Netkong, N. J., 1925, an outbreak of 53 cases occurred, traced to raw milk. Forty per cent of the affected were over 16 years of age. In view of the often observed preponderance of milk-borne typhoid fever in children, usually attributed to a greater consumption of milk at that period of life, the opposite occurrence in scarlet fever and diphtheria seems especially puzzling and is a question requiring further observation and study.

For detailed summary of epidemics see Table 14.

#### DIPHTHERIA

There are herein reported 26 outbreaks of milk-borne diphtheria with a total of 971 recorded cases and 6 recorded deaths. Eight outbreaks were attributed to raw milk—one (No. 22) of which was

"certified"—one to Pasteurized milk, one to ice cream, and one to butter. In the remaining 15 outbreaks the character of the milk was not definitely stated. For geographical location see Table 8. The monthly distribution of cases may be seen in Table 6. For a detailed summary of epidemics see Table 15.

TABLE 8.—*Milk-borne outbreaks of diphtheria*

State	Number of epidemics	Number of cases (incomplete)	Number of deaths (incomplete)	State	Number of epidemics	Number of cases (incomplete)	Number of deaths (incomplete)
California.....	1	-----	-----	Pennsylvania.....	2	19	-----
Connecticut.....	1	48	-----	Rhode Island.....	1	402	-----
Illinois.....	3	29	-----	Texas.....	1	71	-----
Massachusetts.....	7	103	-----	Vermont.....	1	26	-----
Minnesota.....	2	75	1	Virginia.....	1	15	-----
Nebraska.....	1	110	2	Total.....	26	971	7
New York.....	3	53	-----				
Ohio.....	2	20	4				

## MISCELLANEOUS DISEASES

One outbreak each of botulism, appendicitis, parotitis, Malta fever (goat's milk), poliomyelitis, erythema arthriticum epidemicum, and a dengue-like syndrome are recorded in Table 16, together with five outbreaks of gastroenteritis.

## SUMMARY

1. In addition to 179 milk-borne outbreaks in the United States collected by various authors prior to 1908 there is herewith reported a compilation of 612 additional epidemics traced to milk or its products to 1927.

2. Ordinary raw milk, or its products, was incriminated in 179 outbreaks; "Pasteurized" milk or its products was incriminated in 29 outbreaks, certified milk in 3, while in 356 the character of the incriminated supply was not stated. Ice cream was incriminated in 36 outbreaks, butter in 3, and cheese in 4.

3. Incomplete records of cases and deaths for the 612 herein-reported milk-borne outbreaks indicate the following:

TABLE 9.—*Summary of 612 milk-borne outbreaks*

Disease	Number of outbreaks	Number of cases (incomplete)	Number of deaths (incomplete)
Typhoid fever.....	479	14,968	219
Paratyphoid.....	7	434	15
Diarrhea and dysentery.....	6	92	5
Septic sore throat.....	42	21,045	139
Scarlet fever.....	40	3,939	20
Diphtheria.....	26	971	7
Miscellaneous diseases.....	12	878	5
Total.....	612	42,327	410

4. A gradual increase in the reported number of milk-borne epidemics in the United States is noted from 1881 to 1914, following which year a decrease is noted.

5. Carriers, active cases, and exchange of infected bottles, in the order named, are noted as the most prolific source of milk infection by typhoid bacilli.

6. A markedly increased prevalence of milk-borne typhoid outbreaks is noted in August and September.

7. Those outbreaks attributed to carriers reached their greatest incidence of onset during August while in those traced to active cases the highest occurrence was in September.

8. A reversal in the usual age incidence is noted in a few scarlet fever and diphtheria outbreaks traced to milk and is a common feature in milk-borne typhoid fever.

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## Appendix

TABLE 10.—Typhoid fever

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
1	February, 1906	Hanson, Mass	9	—	9	Milk	Cases on 1 small route. Second case of outbreak was in dairyman who milked and handled utensils. Farm well pol- luted.	Polluted well—case on farm.	Massachusetts De- partment of Health, report special milk board, 1916, p. 266. Do.
2	September, 1906	Natick, Needham, and Wellesley, Mass.	119	—	98	do	Explosive. 98 cases on 1 route. First case of series was a waitress who served dairy employees.	Dairy employees prob- ably infected through case in restaurant.	H. H. Thompson, Journal American Medical Association 1912, vol. 58, pp. 932-933.
3	January, 1907	Noblesville, Ind	18	—	15	Raw milk	Employees 15 of cases purchased milk from Mrs. H. who supplied 85 families. Husband at farm had typhoid August and September, 1906. Excreta placed in open privy 35 feet from shallow well. Latrine polluted. Cans washed in this cold water. Sale of milk stopped and typhoid outbreak ceased.	Well water polluted by case on the dairy. This water used for washing utensils.	
4	July-August, 1907	Choschocton, Ohio	39	—	35	do	Employees 36 cases among users of J. E. H.'s milk. Bottles washed in polluted well and spring water. 5 cases of typhoid occurred on farm at time of outbreak.	Not discovered	Report of Ohio State Board of Health, 1907, pp. 189-193.
5	August-Septem- ber, 1907	Bridgeport, Conn	27	1	13	do	13 cases on 1 milk route. This distributor purchased 1 milk from 9 sources. 5 persons with positive Widal's were discovered on 1 farm. No bacteriological tests made. Sale of milk discontinued and epidemic stopped.	Carriers on farm	C. N. Haskell, Journal American Medical Association, 1908, vol. 50, pp. 846-847.
6	September, 1907	Cambridge and Som- erville, Mass.	61	—	33	Milk	Simultaneous outbreaks, 33 on 1 route. Botcher was acting as nurse to active case.	Botcher nursing ty- phoid case.	Massachusetts De- partment of Health, report special milk board, 1916, p. 266.
7	November, 1907	Bondville and Bel- chertown, Mass.	21	0	21	do	Cases all on 1 route. Distributor secured part of his milk from a dairy on which an unrecognized case of typhoid had oc- curred beginning October 7. The milk acted as nurse. Dairy in poor condition.	Unrecognized case on the dairy. Milker acting as nurse.	Report Massachusetts State Board of Health, 1907, p. 489.
8	1907 (fall)	Kenton, Ohio	—	—	—	do	Investigation showed 1 dairy had become infected and was responsible for a con- siderable portion of cases.	Not stated	Report Ohio State Board of Health, 1907, p. 27.

9	do	Wilkes-Barre, Pa.		All	do	Case on farm followed by outbreak among customers.	Case on farm	Report State Commissioner of Health, Pennsylvania, 1910, p. 1138.
10	1907	Sugar Pine Mills, Calif.	8	8	Raw milk	Milk supplied by a Chinese dairyman.	Not stated	Journal Medical Association, 1907, vol. 49, p. 1287.
11	March-September, 1908.	Salem City, N. J.	30	22	do	22 cases on 1 of 13 milk routes selling in city. This dealer sold 250 quarts of milk daily. No cases at farm. No search for carriers. Well polluted, water used for washing utensils, 1 case had used this water but no milk.	Infected well water used to wash utensils.	Report New Jersey State Board of Health, 1908, pp. 147-150.
12	March, 1908	North Branch, Minn.	10	7	do	7 cases among users from dairy. 3 due to contacts. Dairy P supplied 25 families. No case in North Branch for 17 years before P moved to town. Father, mother, and 2 sisters of P had typhoid in 1901. Of these possible carriers, mother alone occasionally helped with milk. She gave positive Widal. Forbidden to handle milk and no more typhoid occurred until 1914.	Carriers on farm occasionally washing utensils.	American Journal Public Health, 1914, vol. 4, p. 667.
13	March, May, 1908.	Jamaica Plains, Mass.	410	348	do	Explosive; 348 cases supplied by dairies F and I. These 2 dairies had only 1 common supply—dairy X. Dealer F first victim of outbreak, and he probably infected I's supply through interchange of cans at dairy X.	Case on farm and interchange of infected cans.	Report Massachusetts State Board of Health, 1908, No. 34, p. 751.
14	April-May, 1908	Providence, R. I.	118	6	Milk	Explosive. All on 1 milk route selling bottled and bulk milk. (500 families secured milk from each supply.) Cases all on bottled supply. Bottled and bulk from same supply and delivered by same man.	Interchange of infected bottles.	Report Superintendent of Health, Providence, R. I., 1908, pp. 50-51.
15	April, 1908	do	21	0	do	Explosive; cases on route of Mr. B. A possible case of typhoid on farm in January, 1908. This supply also accounted for synchronous outbreak at Cranston, R. I.	Case or carrier on farm.	Report Superintendent of Health, Providence, R. I., 1908, p. 50.
16	May, 1908	Brockton, Mass.			do	Series of cases on 1 route. First case of series in dairyman's family.	Case on farm	Massachusetts Department of Health, report special milk board, 1916, p. 256.
17	do	Everett, Mass.	23	12	do	12 cases on 1 route. First case occurred in dairyman's family.	do	Do.
18	July-August, 1908.	Altoona, Pa.	95	61	Raw milk	Explosive. 61 cases on 1 milk route. 4 cases typhoid on farm May to September.	Cases on producing farm. Heavy rains may have contaminated spring.	Report Pa. State Commissioner of Health, 1908, pp. 1220-1221.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
19	July-September, 1908.	North Cambridge and Lexington, Mass.	39	—	39	Milk	Cases on 1 route. Dairyman nursed case of typhoid and washed bottles.	Bottle washer nursed active case.	Massachusetts De- partment of Health, report special milk board, 1916, p. 256.
20	July-August, 1908.	Highland Falls, N.Y.	31	—	19	do	Explosive; cases mainly on route of Mr. R. and Mr. V. The latter handled 80 quarts; had 19 cases on route and several cases on dairy but too late to explain early cases.	Source not determined.	Twentieth Annual Re- port State De- partment of Health, New York, 1908, vol. 1, p. 540-556.
21	July, 1908.	Danbury, Conn.	12	—	9	do	Explosive. Dairyman found to be a "walking" case. All cases used portion of supply bottled by this man.	"Walking" case wash- ing and filling bot- tles.	G. E. Lemmer, Re- port Connecticut State Board of Health, 1907-8, p. 10.
22	August-Decem- ber, 1908.	Lowell, Mass.	140	—	31	do	31 cases on 1 of 3 or 4 of this dealer's routes. Carrier located on dairy who had deliv- ered milk on the route with cases.	Carrier at dairy	Massachusetts De- partment of Health, report special milk board, 1916, p. 256.
23	August, 1908.	Lohanon Township, N. J.	"Sev- eral."	—	—	do	Cases among users of milk from a dairy- man with case in family. Sale of milk discontinued and cases stopped.	A case on farm.	Report New Jersey State Board of Health, 1908, p. 143.
24	August-Septem- ber, 1908.	Denver, Colo.	53	6	53	do	53 cases on 1 dairy route serving 150 cus- tomers. Several cases on dairy. Dis- charges placed in open privy; numerous flies. Typhoid recovered from petri dishes exposed to flies.	Cases on farm. Files a factor.	Ninth Biennial Re- port, State Board of Health, 1907-08, p. 15.
25	August, 1908.	Philadelphia, Pa.	25	—	25	do	Cases on 1 route. Driver ill in July but worked about milk house washing bottles, etc.	Ambulant case at dairy.	Annual Report of Philadelphia, 1908, pp. 327-328.
26	do	Indianapolis, Ind.	12	—	12	do	All on 1 milk route.	Not given.	Indiana Medical Jour- nal, September, 1908, vol. 2, p. 118.
27	do	Iowa City, Iowa.	13	—	13	Raw milk	13 cases in 3 families using a common milk supply. Milker had typhoid 15 months previously and found to be a carrier.	Urinary carrier doing milk.	Henry Albert, Journal American Medical Association, 1908, p. 982.
28	Summer, 1908.	Wilkes-Barre, Pa.	20	—	20	Milk	Cases on 1 route. Case found on dairy farm.	Case on dairy	Report State Com- missioner of Health, Pennsylvania, 1910, p. 1138.

29	1908.....	Terryville, Conn.....	.....	.....	All.....	do.....	Cases all on 1 route. Portion of milk distributed came from a farm "which has a typhoid history."	Not stated.....	Journal American Medical Association, 1908, vol. 51, p. 46.
30	September, 1908.....	Walton, N. Y.....	15	2	15	do.....	All cases on 1 route selling to two-thirds of population; portion of distributors supply from a dairy with case in family. Milker assisted with nursing.	Milker acting as nurse to case on farm.	L. M. Wachtler, Twenty-ninth Annual Report New York State Department of Health, Vol. I, 1908, pp. 556-566.
31	September, 1908, to March, 1909.....	Camden, N. Y.....	14	.....	12	Raw milk.....	12 cases on 1 dairy selling one-third of milk used in Camden; no typhoid on farm; dairies in good condition; water all right; search for carriers not completed at time of report.	Undiscovered.....	Report New York State Board of Health, 1909, Vol. II, pp. 468-472.
32	September-October, 1908.....	Philadelphia, Pa.....	22	.....	22	Milk.....	Cases on 1 route securing portion of milk from dairy in Oaks which had 6 cases of typhoid in family—the first on August 15.	Milk purchased from a family with typhoid.	Annual Report Bureau of Health of Philadelphia, 1908, p. 328.
33	do.....	Washington, D. C.....	54	8	54	do.....	Explosive. Cases occurred on routes of 2 dairymen, each securing portion of his milk supply from Mrs. X. Mrs. X, who had typhoid 18 years previously, was found to be a carrier. Sale of this milk stopped and 8 days later last case appeared.	Carrier on a farm furnishing milk to 2 distributors.	Hygienic Laboratory Bulletin 52, 1909, pp. 102-106.
34	Fall, 1908.....	West Pullman, Ill.....	50	.....	.....	do.....	Milk distributed from a farm where typhoid existed.	Case on producing farm.	Journal American Medical Association, 1908, vol. 51, p. 1432.
35	November, 1908.....	Providence, R. I.....	36	4	36	do.....	Explosive. Cases all on route of Mr. C. selling milk to 500 to 600 families. Outbreak traced to supply farm at South Kensington. Cases occurred later in families of Mr. C. and 1 of his deliverymen.	Cases on supply farm.	Report Superintendent of Health of Providence, R. I., 1908, pp. 51-62.
36	December, 1908.....	Cooperstown, N. Y.....	25	.....	23	do.....	Explosive. 15 cases under 15 years of age. 92 per cent of cases on dairy route supplying 60 per cent of people. Milk of this distributor purchased from 200 farms. Source of typhoid not located.	Source not determined at time of report, but thought to be on some supply farm.	Report New York State Department of Health, Vol. II, 1909, pp. 483-490.
37	1908.....	Barberton, Ohio.....	27	.....	27	Raw milk.....	Cases on 1 route. Outbreak began 1 month after distributor purchased milk from 2 farms where typhoid existed. No examination for carriers. (Outbreak 1913 on same route attributed to same farms.)	Probable carriers on supply farm.	Report Ohio State Board of Health, 1913, pp. 765-766.
38	1908.....	Salt Lake County, Utah.....	26	.....	26	Milk.....	Explosive. All cases on 1 milk route, on the premises of which a case of typhoid occurred during the previous year.	Infection of milk by a possible carrier through agency of flies.	Report Utah State Board of Health, 1909, pp. 91-92.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
39	February, 1909	Muhlenberg College, Allentown, Pa.	9	—	9	Milk	Cases on 1 supply—water from infected stream used to prime pump from which water was secured to dilute the milk.	Infected water used to dilute milk.	Report State Commissioner of Health, Pennsylvania, 1909, pp. 1573-1574.
40	April-May, 1909	Cranford, N. J.	20	—	19	Raw milk	19 cases on route of Mr. D, who supplied 10 per cent of milk of town; 60 per cent of D's milk came from J, who had 2 cases of typhoid in his family in 1902. No carriers found, however. D removed bottles daily from home of first case. Mother attending case handled bottles. D sold only bottled milk.	Bottles from first case probable source.	Report New Jersey State Board of Health, 1909, pp. 91-92.
41	June, 1909	Campello, Mass.	7	—	7	Milk	Cases on 1 route. Case on producing farm.	Case on farm	Journal American Medical Association, 1909, vol. 83, pp. 214.
42	July, 1909	Philadelphia, Pa.	20	2	20	do	Explosive. Cases all on 1 route. 2 cases on farm 2 weeks before outbreak.	do	Report Bureau of Health of Philadelphia, 1909, p. 276.
43	do	do	9	—	9	do	Cases on 1 route. Dairyman developed typhoid just prior to outbreak, but continued sale of milk from premises.	do	Do.
44	July-August, 1909	Greenville, Ohio	16	—	12	do	Explosive. Wife at dairy developed typhoid 2 weeks before outbreak. Husband acting as nurse and doing milking. Well on farm polluted.	Milker nursing case on farm.	H. M. Platter, Ohio, Board of Health Quarterly Bulletin, Vol. I, 1909, p. 185-190.
45	do	Mansfield, Ohio	140	—	—	do	Explosive. 15 cases of typhoid discovered in country among milk producers. This milk excluded and epidemic ceased. 17 cases on 1 supply. Case on dairy suffered with illness diagnosed as "malaria," 3 weeks before outbreak. Widal, however, was positive.	Cases on producing farm.	Report Ohio State Board of Health, 1909, p. 88.
46	August, 1909	Woodmont, Conn.	17	1	17	do	Explosive. Previous to outbreak there had been 2 cases at dairy farm. Test on all handlers of milk failed to detect carriers.	Case on farm	Report Connecticut State Board of Health, 1909-10, pp. 111-112.
47	August-September, 1909	Mansfield Reformatory, Ohio.	24	—	24	do	Explosive. Previous to outbreak there had been 2 cases at dairy farm. Test on all handlers of milk failed to detect carriers.	Not determined	H. M. Platter, Ohio State Board of Health, 1909, p. 89.

48	August, 1909	Salem, Ohio	23	19	do	19 cases on 1 route. Wife of dairyman developed typhoid 2 weeks before epidemic. Milk utensils cooled in water of a well polluted from privy 20 feet away and overflowing.	Case on farm, milk probably infected through polluted water used for cooling utensils.	Report Ohio State Board of Health, 1909, p. 88.
49	do	Germanatown, Ohio	24	23	do	Explosive. 23 cases on 1 route. No illness on dairy—no examination for carriers. Milk bottled and it was thought that bottles played part in spread.	Interchange of infected bottles (Carriers not eliminated.)	Report Ohio State Board of Health, 1909, pp. 88-89.
50	August-October, 1909	Manhattan and Bronx, New York City.	380	380	do	Explosive. Cases mainly on 1 route. Outbreak traced to dairy X at Camden, N. Y. Dairyman had typhoid 46 years ago and was found to be a carrier. Tremendous typhoid history associated with his family for years.	Dairyman a carrier.	Chas. Bolduan and W. Carey Noble, Journal American Medical Association, 1912, vol. 58, pp. 7-9.
51	August, 1909	Ithaca, N. Y.	35	35	do	Explosive. All cases on 1 route. Source of infection not stated.	Not stated.	Public Health Reports, 1909, vol. 24, Part II, p. 1406.
52	September, 1909	Jefferson,	60	60	do	Explosive. Cases had all taken meals at hotel in Jefferson, Mass., Sept. 5 or 6. Cases scattered over surrounding territory—no other common factor. Of 59 cases interviewed, all had used milk at hotel. Maid developed typhoid just prior to outbreak. She was fond of milk and had good opportunity to infect dip milk served to guests. Left-over portion allowed to stand in can over night uniced.	Dip milk infected by case in incubation or early stage of illness.	Report Massachusetts State Board of Health, 1909, pp. 624-628.
53	do	Maynard, Mass.	2	2	Raw milk	Two cases on a 2-cow dairy of Mr. X. X. had typhoid in 1905 and was found to be a urinary carrier. Investigation found 9 and possibly 12 cases of typhoid on the route September, 1906, to September, 1909. Dairy was kept in filthy condition.	Urinary carrier on farm milking and straining milk.	Report Massachusetts State Board of Health, 1909, pp. 629-631.
54	do	Brighton, Waltham, and Brookline, Mass.	113	99	Milk	Simultaneous outbreak. 94 cases on 1 supply; 3 possible carriers located in a capper and 2 on supply farm. Cows diseased and milk with polluted water. Dashed at milk 4 cases occurred among with typhoid. 4 cases occurred among customers of this small dairy.	Not determined.	Massachusetts Department of Health, Report on Milk and Milk Products, 1916, p. 257.
55	September-October, 1909	Roscoe, Ohio	4	4	Raw milk	30 cases on 1 route supplying 130 customers. Milk from 3 farms on 1 of which a typhoid case developed in May, removed to hospital and had not returned. 2 other supply farms were using polluted wells. No search for carriers made. Bottles were collected from homes having cases and not properly sterilized. 8 cases had occurred on same route in 1908.	Case on dairy.	H. M. Platter, Report Ohio State Board of Health, 1909, p. 93.
56	do	Plainfield, N. J.	30	30	Milk		Possibly a carrier on supply farm or through infection of bottles.	Report New Jersey State Board of Health, 1909, pp. 96-97.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
57	1909	Worcester, Mass.	14		14	Milk	Cases all on 1 route. 50 people on supply farms examined by Widal and 1 positive found. This man worked on the best farm, which produced bottled milk for particular customers. Cases all found to be among users of this supply. Cases all traced to ice cream from Mansfield, where typhoid was epidemic.	Carrier on farm	E. D. Bigelow, Jour- nal American Med- ical Association, 1911, vol. 57, pp. 1418-1420.
58	1909	Jeromeville, Ohio	15		15	do	Cases all traced to ice cream from Mansfield, where typhoid was epidemic.	Ice cream produced in epidemic territory; means of infection not determined.	Report Ohio State Board of Health, 1909, p. 88.
59	1909	Detroit, Mich. (First outbreak.)				do	Small outbreak traced to milk; corrective measures checked outbreak.	Not stated.	29th Annual Report City of Detroit Board of Health, ending June 30, 1910, p. 14.
60	1909	Detroit, Mich. (Second outbreak.)				do	Small outbreak traced to milk. Correc- tive measures checked outbreak.	do	29th Annual Report City of Detroit Board of Health, ending June 30, 1910, p. 14.
61	1909	Fort Sill, Okla.	16	3	16	Ice cream	Explosive. Traced to ice cream manufac- tured at Lawton and sold in post ex- change.	do	U. S. Army, Surgeon General's report, 1910, pp. 45-48.
62	February, 1910	Philadelphia, Pa.	19		19	Milk	Cases all on 1 route. Outbreak traced to dairy selling 30 quarts of cream daily to distributor; 6 cases typhoid on this pro- ducing farm.	Cases on farm	Annual report Phila- delphia Bureau of Health, 1910, p. 339.
63	do	Borough of Manhat- tan, New York City.	44		44	do	Explosive; outbreak confined to small dis- trict. Practically all cases supplied by 1 milk company. A carrier located on 1 of the producing farms. Raw milk bot- tled in country and delivered in New York. All cases on this supply.	Carrier on farm	C. F. Bolduan and W. Carey Noble, New York Medical Jour- nal, 1911, vol. 94, p. 1313.
64	March, 1910	Lynn, Swampscott, Mass.	48			do	Milk supply suspected and was discon- tinued. Outbreak ceased.	Not determined	Massachusetts De- partment of Health, report special milk board 1910, p. 237.
65	do	Lanconing, Md.	11		11	do	11 cases on 1 supply. Milk believed to have been infected through polluted well.	Polluted well	Report Maryland State Board of Health, 1910, pp. 123, 352.

66	May, 1910	North Adams, Mass	7	7	do	Daughter of dealer who handled milk was a carrier.	Carrier handled milk.	Massachusetts Department of Health, report special milk board, 1910, p. 257.
67	July, 1910	Mitchells, Va.	11	8	do	Explosive; 8 cases on 1 milk supply. Only source of infection discovered was a case in a neighbor few hundred yards from the dairy. No direct contact, but flies may have carried infection from improperly treated excreta.	Files	Report Virginia State Commissioner of health, 1910, p. 45.
68	do	Ipswich, Mich.	11	11	do	Explosive. Cases on 1 route. Polluted water used for washing utensils.	Polluted water used for washing utensils.	Massachusetts Department of Health, report special milk board 1910, p. 257.
69	do	Wayland, Waltham, Newton, Peabody, Brockton, and Milford, Mass.	93	93	do	Not explosive. Cases on 1 route followed use of bottles from infected homes.	Exchange of infected bottles.	Do.
70	do	Gettysburg Camp, Pa.	11	11	Raw milk	11 cases confined to 2 organizations using raw milk from a local supply. A suspicious case of illness found on dairy. Contact infection could not be ruled out in some cases.	Case on producing farm.	Alexius M. Glannon and W. P. Morrill, The Military Surgeon, vol. 29, 1911, pp. 359-373.
71	July and August, 1910.	Wilkes-Barre, Pa., and vicinity.	32	32	Milk	Explosive. Cases on 1 supply. Water of spring infected by broken sewer used by neighbors where 5 cases developed July 1 to 24.	Contaminated water used on utensils.	Report State Commissioner of Health, Pennsylvania, 1910, p. 1136.
72	July - September, 1910.	Strasburg, Va.	18	18	do	All used milk from 1 family or ate ice cream made from this milk. Typhoid was present on the dairy farm.	Cases on farm	Annual Report Virginia State Commissioner of Health, 1910, p. 46-47.
73	July - November, 1910.	Hooperstown, Ill.	100	100	do	Approximately 100 cases, nearly all on the roads of 2 distributors, each of which had had a typhoid case previously; 1 passed to be carrier. These people were assisting with the milk preparation. Shutting off of milk quickly checked outbreak.	do	Monthly Bulletin Illinois State Board of Health, vol. 6, 1910, pp. 558-559.
74	August, 1910.	Worcester, Mass	213	10	Raw milk	Cases on 1 route. A carrier located on 1 of supply farms. Urine positive for B. typhosus, feces negative to 4 tests.	Urinary carrier on farm.	E. B. Bigelow, Journal American Medical Association, 1911, vol. 57, pp. 1418-1420.
75	August - September, 1910.	Bowmans, Va.	4	4	do	First case was Mrs. H., who sold milk to F., family where disease developed. A visitor who drank milk at F.'s also developed the disease.	Case on farm	Annual Report, Va. State Comr. of Health, 1910, p. 47.
76	do	Mount Joy, borough, Pa.	42		Milk	Explosive. Cases all among 100 families using milk from 1 dairy, 3 cases on dairy. Nurse milked and cared for milk. Water on farm polluted.	Active cases on producing farm. Water polluted.	Report State Commissioner of Health, Pennsylvania, 1910, pp. 1278-1284.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
77	August - Septem- ber, 1910.	Swampscott, Mass.	7	-----	7	Milk	Cases on 1 route. Milk supply stopped and outbreak ceased.	Not determined	Massachusetts De- partment of Health, report special milk board, 1916, p. 268.
78	August - Novem- ber, 1910.	Lowell, Mass.	136	-----	58	do	48 cases on 1 route. Carrier in dealer's employ. 2 cases on a supply farm.	Carrier in distributor's employ and 2 cases on a supply farm.	Massachusetts De- partment of Health, report special milk board, 1916, p. 267.
79	September - Octo- ber, 1910.	Adirondack Moun- tains, summer re- sort, N. Y.	14	-----	14	Raw milk	13 cases were among heavy milk drinkers; milk secured from a 4-cow dairy. Car- rier was located who helped to measure the milk after milking.	Carrier who measured milk after another had milked it.	C. E. North, Medical Record, vol. 79, 1911, pp. 517-523.
80	do	Ottawa, Ill.	15	-----	13	Milk	13 of cases were on route of dairyman who had a case of typhoid in his family.	Case on farm	Monthly Bulletin Illi- nois State Board of Health, vol. 6, No. 12, December, 1910, p. 559.
81	September, 1910.	Line Ridge and Es- pey, Pa.	53	-----	-----	Ice cream	Transmitted through ice cream from a dealer purchasing milk from C. U., who also sold a small amount of milk in the community. Mrs. C. U. taken ill of typhoid Aug. 1; 2 other cases in family later. Husband did nursing and milking. No precautions taken about sick room or with discharges.	do	Report Pennsylvania State Commissioner of Health, 1910, p. 354.
82	do	Wayne, Pa.	10	-----	9	Milk	Outbreak localized to one part of town. 9 cases on route of Mr. T., who purchased part of his milk from a farm on which had occurred 2 suspected cases of typhoid fever during the past few months. A carrier previously prohibited from sell- ing milk gave some away and caused 2 cases.	Cases on farm	Report Pennsylvania State Commissioner of Health, 1910, p. 351.
83	do	Maynard, Mass.	4	-----	2	do	-----	Carrier on small dairy	Massachusetts De- partment of Health, report special milk board, 1916, p. 268.
84	do	Sterling Junction, Mass.	5	-----	5	do	Cases on 1 route supplied by dairyman who was an active case.	Case on farm	Massachusetts De- partment of Health, report special milk board, 1916, p. 267

85	November - December, 1910.	Enumclaw, Wash.	48	4	48	Raw milk.	Explosive outbreak in a mill camp. All cases used milk from 1 dairy. Typhoid occurred in every family using this milk with exception of one which used milk only for cooking. Proprietor of dairy developed typhoid early in November. Not diagnosed at time. Wife nursed, and attended milk. Sale of milk prohibited and epidemic stopped. Believed to be due to milk shipped from Philadelphia on Nov. 9, 1910.	.....do.....	E. E. Heg, Northwestern Medical Association, 1911, vol. 3, p. 231.
86	November, 1910.	Naval Academy, Annapolis, Md.	30	---	30	Milk.	35 cases traced to milk.	Not determined.	Report Maryland State Board of Health, 1910, p. 297.
87	1910.	Syracuse, Union Springs, Moravia, and Ithaca, N. Y.	35	---	35	do.	Explosive. The 30 earliest cases investigated and 28 on 1 route. An undiscovered carrier thought to be the cause, but later stated that dealer secured milk from a neighbor who had a case of typhoid in his family. (Ohio State Board of Health report, 1914, p. 722).	Not stated.	Report New York State Department of Health, 1910, p. 244.
88	1910.	Canal Dover, Ohio.	60	---	60	do.	80 cases mainly traceable to a dairyman in country who had had typhoid 4 months previously and was doing milking. Bacilli in urine.	Case on farm.	Report Ohio State Board of Health, 1910, p. 116.
89	January-February, 1911.	Oskaloosa, Iowa.	80	---	---	do.	Explosive. Outbreak traced to cream from dairy O. New helper employed Feb. 1 found to be a carrier of 10 years' standing. Typhoid recovered from his stools.	Carrier on farm.	H. Albert, Journal Iowa State Medical Society 1911, vol. 1, p. 104.
90	March-April, 1911.	Hotel on Gulf of Mexico.	10	---	10	do.	Explosive. Outbreak traced to cream from dairy O. New helper employed Feb. 1 found to be a carrier of 10 years' standing. Typhoid recovered from his stools.	.....do.....	E. O. Jordan and E. E. Irons, Journal American Medical Association, 1912, vol. 58, pp. 170-171.
91	Spring, 1911.	McSherrystown, Pa., and vicinity.	68	7	56	Ice cream.	56 cases had eaten ice cream made from cream purchased in part from a farm where 2 cases typhoid existed. Ice cream manufacturer and daughter developed disease. Cases mainly under 15 years of age.	Cases on producing farm.	Report State Commissioner of Health, Pennsylvania, 1911, pp. 190-196.
92	June-August, 1911.	Lambertville, N. J.	41	---	35	Milk.	Of 36 cases investigated 35 used milk from dairyman A, delivering 12 per cent of city supply. No typhoid on dairy or supply farm and no positive Widals on A's farm. Tickets and bottles were returned from first cases beginning June 21. This practice stopped, utensils sterilized, and milk Pasteurized and outbreak stopped.	Probably bottle infection.	Report New Jersey State Board of Health, 1911, pp. 101-113.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
93	June-July, 1911....	Englewood, Ill.....				Milk.....	Epidemic traced to B's dairy. Step-daughter found to be a carrier.	Carrier on farm.....	Monthly Bulletin Illinois State Board of Health, December, 1911, vol. VII, p. 766.
94	June, 1911.....	Shelton, Conn.....	41	1	41	Raw milk....	Cases all on one route. On 1 supply farm a farm hand in the early stages of typhoid had cared for milk.	Case in early stages of typhoid cared for milk on producing farm.	G. A. Shelton, report Connecticut State Board of Health, 1911-12, pp. 99-100.
95	.....do.....	Fitchburg, Mass.....	18		12	Milk.....	12 cases on 1 route. Probable carrier on supply farm.	Probably carrier on supply farm.	Massachusetts Department of Health, report milk board, 1916, p. 258.
96	June-August, 1911..	Little Rock, Ark.....	321		321	Pasteurized flash.	Study of early cases pointed to 1 large dairy as having played a decisive rôle in outbreak. Contact infection prevalent later.	Not stated.....	W. H. Frost, Annual Report United States Public Health and Marine Hospital Service, 1911, pp. 30-32, and E. S. Godfrey, Nation's Health, 1923, vol. 5, pp. 1-6.
97	June-July, 1911....	Chicago, Ill.....	71		71	Raw milk....	Explosive. All cases on route of dairyman A, who received milk from 1 farm which caused outbreak in Chicago in 1908. Daughter of this producer found to be a carrier.	Carrier on farm.....	Report Department of Health, city of Chicago, 1911-1918, p. 1003.
98	July, 1911-April, 1912.	Belleville, Ill.....	92	6	79	Milk.....	86.3 per cent of cases known to have used milk from dairy A. Children and women largely attacked. Mrs. A, who sometimes washed utensils, found to be a carrier. A supplied about 150 homes.	Carrier on farm washed utensils.	H. N. Parker, American Journal of Public Health, vol. 3, 1913, pp. 486-491.
99	July-September, 1911.	Willoughby, Ohio.....	34	2	34	Raw milk....	All cases on route of one dairy. This dairy supplied milk to two undiagnosed cases in July. City water unsafe and probably accounts for primary cases.	Bottles returned from undiagnosed cases on route.	Report Ohio State Board of Health, 1911, pp. 447-449.
100	July-November, 1911.	Philadelphia, Pa.....	92		92	Milk.....	Interruption in Pasteurization at a milk plant.	Not stated.....	Annual Report Philadelphia Bureau of Health, 1911, pp. 175, 51.

101	August, 1911.....	Compton, Ill.....	10	10	do.....	Carrier or convalescent.....	Carrier or convalescent.	Illinois Health News, August, 1923, vol. 9, p. 241.
102	August-September, 1911.	Attleboro, Mass.....	46	43	do.....	Explosive. 43 cases on 1 route. Active case on a producing farm with badly polluted water used for washing utensils.	Case on a producing farm.	Massachusetts Department of Health, report special milk board, 1916, p. 288.
103	do.....	Newark, Ohio.....	55	44	do.....	Explosive. 44 cases used milk from 1 dairy. 11 uncertain as to milk supply. Case on route in June may have infected bottles. Dairy closed and epidemic stopped. No typhoid on any of supply farms.	May have been through bottles.	Report Ohio State Board of Health, 1911, pp. 438-443.
104	August-October, 1911.	Worcester, Mass.....	14	14	Raw milk...	Cases all on 1 dairy route; delivery about 60 quarts daily. Dairyman found to have had typhoid 1 and 7 years previously. <i>B. typhosus</i> present in his stools. Prohibited his handling milk and no more cases occurred.	Carrier on farm.....	E. B. Bigelow, Journal American Medical Association, vol. 58, 1912, p. 1339.
105	September-November, 1911.	Texarkana, Ark.-Tex.	34	33	Milk.....	Cases confined to better residential section. 22 under 15 years of age. 33 of cases among milk drinkers, of these 75 per cent used only milk from dairy No. 1 and 25 per cent used milk occasionally from this source. No typhoid on dairy No. 1. Utensils washed in polluted water. No examination for carriers made.	Polluted water on farm and by returned bottles.	J. R. Riddow, Weekly Public Health Reports, 1912, vol. 27, Part I, pp. 219-227.
106	September, 1911....	Barton Heights, Va....	7	6	do.....	6 cases on a dairy supplying only a small part of town. Bottles returned from neighboring family where there was a case of typhoid. No sterilization. Sterilization begun and outbreak ceased.	Exchange of infected bottles.	Report Virginia Commissioner of Health, 1911, p. 45.
107	September-October, 1911.	San Francisco, Calif..	34	34	do.....	24 cases on 1 route and other 10 used milk from same dairy at restaurants. A carrier was found on farm who helped with milking. Milker removed and utensils, etc., sterilized and outbreak ceased.	Carrier on farm—milker.	Report San Francisco Department of Health, 1911-12, pp. 5-6.
108	October-November, 1911.	Xenia, Ohio.....	3	3	Raw milk...	3 cases on 1 route. Bottles delivered to and returned from an imported case. No typhoid on dairy. Carriers not sought. Sterilization of bottles begun and no further cases developed.	Exchange of infected bottles.	Report Ohio State Board of Health, 1911, p. 461.
109	October, 1911.....	Washington, D. C....	13	13	Milk.....	11 per cent of typhoid of city on 1 route, supplying 4 per cent of people. No other common factor. Several other nonreported cases known to have been on same route. (Source not given.)	Not given.....	L. L. Lumsden, Annual Report United States Public Health Service 1912, pp. 14-15.
110	November, 1911....	Rome, N. Y. ....	9	-----	do.....	Cases largely on 1 route. Milk the only common factor. Infection attributed to creamery.	Undetermined.....	Report New York State Board of Health, 1911, pp. 373-386.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
111	January - Febru- ary, 1912.	St. Charles, Ill.....	44	-----	(1)	Raw milk....	Cases nearly all on two routes M & N. No typhoid on either farm. Both deal- ers delivered milk to a Belgian settle- ment outside St. Charles where typhoid existed. Bottles were collected from infected homes and refilled without ster- ilization. Proper sterilization of bottles began and outbreak stopped.	Probably through ex- change of bottles.	Journal American Medical Association, 1912, vol. 58, pp. 1941-1943.
112	January - April, 1912	Summit and Chat- ham, N. J.	8	-----	8	do.....	Cases all on route of dealer B. Outbreak of 9 cases on same supply in 1914.	Undetermined.....	Report State Board of Health of New Jer- sey, 1914, pp. 72-80.
113	February, 1912....	Milwaukee, Wis.....	5	-----	5	do.....	All on 1 small route. Investigator attrib- uted cases to milk.	Not stated.....	Health Department, Wisconsin, Bulletin, Hulletin, February, 1912, p. 6.
114	May, 1912.....	Anoka City, Minn....	35-40	6	35-40	Butter.....	All cases in 1 ward—water, milk, contact, flies eliminated as causes. A carrier then located who made and sold butter to a grocery.	Carrier making and selling butter to a grocery.	Fourth Biennial Re- port of Minnesota Board of Health, 1913, p. 240.
115	May-June, 1912....	San Francisco, Calif..	53	-----	-----	Milk.....	Cases "mainly" on 1 route or in those who use this supply at restaurants. Cases mild and some doubted its being ty- phoid.	Not stated.....	Report San Francisco Department of Pub- lic Health, 1911-12, pp. 6-7.
116	June-July, 1912....	Woodbury, N. J.....	26	1	25	Raw milk....	25 cases on 1 route delivering 28 per cent of milk of city—other 72 per cent had 1 case. No typhoid or carriers found on produc- ing farms or in distributors' families. Route delivered bottled and dip milk. All cases except 2 were on bottled supply. Bottles often removed from houses and filled on wagon without washing. 2 cases sick in April used this milk and mother acted as nurse and washed bottles. Sale of milk stopped and out- break ceased.	Exchange of infected bottles.	Report New Jersey State Board of Health, 1912, pp. 118-126.
117	July, 1912.....	Paoli, Pa., and vi- cinity.	30	-----	24	do.....	Explosive. 24 cases on 1 supply. Dairy- man refilled returned bottles without sterilization. Dairyman and members of family developed typhoid.	do.....	Report of Commis- sioner of Health, Pennsylvania, 1912, pp. 139-145.

118	July-August, 1912.	Moorestown, N. J.	53	1	do	Explosive; 25 per cent of cases under 11 years. Cases mainly on route of 1 distributor selling 50 per cent of milk of town. It was found that Mr. D. who supplied distributor with 160 quarts daily was slightly ill 5 days before first case appeared on route. D. did milking and was proven to be a carrier. Pasteurization checked epidemic.	Milker was a carrier.	Report New Jersey State Board of Health, 1912, pp. 108-113.
119	do	Cambridge, Md.	55	4	55	Explosive. Cases all on route selling 12 to 15 gallons per day. Hired man had an unrecognized case of mild typhoid just before outbreak. He worked with exception of a few days. Sale of milk stopped and outbreak ceased.	"Walking" case in farm band.	Report Maryland Department of Health, 1912, pp. 182-188.
120	do	Northport, N. Y.	16	14	do	14 cases on route of Mr. S who sold 20 per cent of milk. No typhoid on farm. Strange help employed on farm just before outbreak but left before investigation. Open toilet on farm.	Possibly through a carrier on farm.	Report New York State Department of Health, 1912, pp. 792-794.
121	July-September, 1912.	Middletown, N. Y.	15	15	do	Cases all on 1 route. Bottles returned from typhoid houses and not properly sterilized. A farm hand known to have had typhoid employed on farm during summer but left before investigation.	Probably bottles or a carrier on farm.	Report New York State Department of Health, 1912, pp. 790-792.
122	Summer of 1912.	Near Renovo, Pa.	3	3	do	3 cases occurred in 2 families which purchased milk from farm where 2 cases of typhoid existed.	2 cases on producing farm.	Report of State Commissioner of Health, Pennsylvania, 1913, pp. 195-196.
123	July-December, 1912.	Philadelphia, Pa.	90	90	Milk.	Cases on 1 milk route (one of largest of city). All of this distributor's employees, gave negative Widal's. Milk received from three States—source of typhoid undiscovered.	Undiscovered.	Annual Report Philadelphia Bureau of Health, 1912, p. 214.
124	July-October, 1912.	Suburbantown, Md.	56	4	Raw milk.	50 cases occurred on route of dealer serving three-fifths of town. A carrier was discovered at the dairy handling milk. Samples of milk collected and <i>B. typhosa</i> isolated. Dairy closed and outbreak stopped.	Carrier in a milk handler at dairy.	W. R. Stokes and H. W. Stoner, Medical American Association, 1913, 1927, 61, pp. 1024-1027.
125	August, 1912.	North Chelmsford, Mass.	6	6	Milk.	Cases on 1 route. A probable carrier found on farm.	Probable carrier on farm.	Massachusetts Department of Health, report special milk board, 1916, p. 258.
126	August-September, 1912.	Savannah, N. Y.	12	12	do	Explosive; cases all on route of Mr. W. No cases on farm. Polluted well used for cooling milk. Open privy 40 feet from milk house. Returned bottles not regularly sterilized. Carriers not sought.	Source not determined.	Report New York State Department of Health, 1912, pp. 806-809.

1 Nearly all.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
127	August-Septem- ber, October, 1912.	Norristown, Pa.	91	—	61	Milk	Not very explosive. Dairyman had "grippe", 1916 infant son had typhoid. Carriers (?) Bottles from infected bottles refilled without sterilization. 45 to 50 cases on 1 route. Outbreak traced to dairyman whose wife had typhoid 2 years previously and who handled milk. Dairy closed and in 10 days outbreak ceased.	Exchange of infected bottles. Possibly carriers on farm.	Report State Commissioner of Health, Pennsylvania, 1912, p. 124.
128	August and Sep- tember, 1912.	Towson, Md.	56	4	—	Raw milk	—	Carrier handling milk.	Report Maryland Health Department, 1912, pp. 200-203.
129	September, 1912.	Allentown, Pa.	75	—	36	do.	Explosive. 36 cases on routes of 2 dairy- men selling 151 gallons milk and secur- ing part of milk from farm with active typhoid in August. Cases most nume- rous where this milk sold. City of Allentown had and probably caused some of 75 cases. Milkmen often exchanged milk. Milk can probably infected in another town.	Case on producing farm.	Report State Commissioner of Health, Pennsylvania, 1912, pp. 1308-1330.
130	September-Octo- ber, 1912.	Boxborough, Mass.	3	—	3	Milk	—	Not determined.	Massachusetts Department of Health, report special milk board, 1916, p. 229.
131	September, 1912.	Washington, D. C.	16	1	16	do.	Cases all on 1 dairy supply. Source not determined.	do.	Report Health Officer of District of Columbia, 1912, p. 42.
132	do.	Hopkinton, Mass.	8	—	4	do.	4 cases on 1 route. An active case on farm.	Case on farm.	Massachusetts Department of Health, report special milk board, 1916, p. 228.
133	October-Novem- ber, 1912.	Indiana Harbor, Ind.	54	—	54	Raw milk	Cases on 1 route. On 1 of supply farms a man returned ill of typhoid, mother and father ill later. Father "kept going," nursed wife, and did milking. Pasteurization checked outbreak.	Cases on supply farm.	W. Shimer and J. W. McAbert, Journal American Medical Association, 1913, vol. 60, pp. 1939, 1951.
134	October, 1912.	Evanston, Ill.	11	—	11	Milk	Explosive. 11 children ill in 10 days.	Not stated.	Journal American Medical Association, 1912, vol. 59, p. 1632.
135	do.	Washington, D. C.	46	1	46	do.	Cases on 2 routes securing milk from farms where typhoid was present.	Cases on farm.	Report Health Commissioner of District of Columbia, 1912, p. 42.

136	1912	Bay Ridge, N. Y.					Sharp outbreak attributed to milk—same milk probably accountable for some cases in Queens Borough.	Not stated.	Annual Report New York City Department of Health, 1912, p. 73.
137	1912	Michigan, Ind.	23		22	do.	22 cases on route of Mr. F. Wife of dairyman had typhoid 6 years previously. Typhoid developed in 1908, in house where she was serving as domestic. Milk outbreak 1914 also attributed to her.	Carrier on dairy	Report Indiana State Board of Health, Chem. Div. Lab. Hyg., 1914, pp. 215-217.
138	1912	Canajoharie, N. Y.			All.	do.	Explosive. No common source except milk. Cases all on 1 route. Disinfection of cans, bottles, etc., checked epidemic.	Not stated.	Report New York State Department of Health, 1911, p. 271.
139	1912	Newburgh, N. Y.			All.	do.	Explosive outbreak. All cases on 1 route. Dairyman had typhoid some years before; he refused examination for carrier state. Milk prohibited and epidemic stopped.	Probably due to carrier on farm.	Report New York State Department of Health, 1912, p. 279.
140	December, 1912-January, 1913.	Chelsea, Mass.	30		29	do.	Explosive; 29 cases on 1 route. Infection among users of bottled milk. Evidence of source pointed to 1 farm furnishing 6 to 8 cans daily. This milk mixed with that from 8 other farms and bottled by hand. 3 people still on this farm had typhoid 1906-7. 2 of these examined for carriers with negative results; 1 not examined.	Probably a carrier on supply farm.	Report Massachusetts State Board of Health, 1913, p. 703.
141	1912	Elizabethville, Pa.	34		27	Raw milk.	Not very explosive; 27 cases on 1 dairy of 12 cows; first case occurred on a stream, the water from which was used to rinse utensils. Returned bottles filled along route.	Polluted water used on utensils. Returned bottles re-filled on route.	Report State Commissioner of Health, Pennsylvania, 1912, pp. 224-230.
142	1912	Chester Valley, Pa.	25		25	Milk	Cases on 1 route. 3 cases in dairyman's family.	Active cases on producing farm.	Journal American Medical Association 1912, vol. 59, p. 730.
143	January, 1913	Connellsville, Pa.	37		21	do.	21 cases on route of Mr. G. selling 40 gallons of milk per day. In October a son-in-law of G. was brought to the dairy ill of typhoid and died in November. Three other cases of illness, variously diagnosed, occurred on farm from November to January. In February a case occurred diagnosed as typhoid fever.	Cases on farm.	Annual Report Pennsylvania Commissioner of Health, 1913, Part II, p. 988.
144	January - February, 1913.	Cambridge, Somerville, and Arlington, Mass.	61		57	Raw milk.	Explosive. Outbreak in the 3 communities occurred simultaneously and all except 4 cases secured milk from dealer H. 5 milkers examined for carrier state and 1 carrier located. Discharge of carrier and pasteurization of supply checked occurrence of new cases within 10 days.	One of milkers a carrier.	Report Massachusetts State Board of Health, 1913, p. 709.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
145	April-May, 1913	Chicago, Ill.	11	—	11	Milk	All on 1 route and in houses served by 1 of 2 delivery wagons. This driver and family well. Driver, a suspected carrier, refused examination. Discharged. Cases on 1 route. Case found on a produc- ing farm.	A possible carrier ac- ting as driver of milk wagon. Case on supply farm.	Chicago Department of Health. Report, 1911-1918, p. 1061. Massachusetts De- partment of Health, report special milk board, 1916, p. 299. Report, Ohio State Board of Health, 1913, pp. 765-767.
146	April, 1913	Quincy, Mass.	15	—	15	do	Cases all on 1 route selling 60 to 70 gallons and mainly in "milk age." Outbreak began 2 months after distributor began to purchase milk from 2 farms where ty- phoid previously existed and in 1906 this same dealer had an epidemic begin- ning 1 month following purchase of this milk. There was also a case on distrib- utor's farm. No facilities for sterilizing bottles, open privy within 15 feet of milk house. Polluted well on farm; sale of milk stopped and outbreak ceased. No search made for carriers on supply farm at time of report.	Case on distributor's farm and probably carriers on supply farms.	
147	May, 1913	Barberton, Ohio	8	—	8	Raw milk	Explosive. Cases mainly on 1 route. Dis- tributor receiving empty milk bottles from homes of patients and refilling them without sterilization. Examination of Pasteurized milk showed high counts and colon bacilli. 3 weeks after inspec- tion of company's procedures, new cases on route fell from 90 to 4. Cases on 1 route. Employee had typhoid 3 or 4 years previously. Sale of milk stopped and outbreak ceased.	Interchange of bottles and possibly faulty Pasteurization.	Report, Indiana State Board of Health, Bact. & Path. Div., Lab. Hyg., 1913, pp. 66-69.
148	July-August, 1913	Evansville, Ind.	203	—	—	Pasteurized milk.	Cases on 1 route. Employee had typhoid 3 or 4 years previously. Sale of milk stopped and outbreak ceased.	Possible carrier on farm.	Massachusetts De- partment of Health, report special milk board, 1916, p. 259. Do.
149	July, 1913	Pittsfield, Mass.	9	—	9	Milk	"Several" cases on 1 supply. Probable case on dairy 2½ months previously. Sale of milk stopped and outbreak ceased.	Probable convalescent on farm.	
150	July-September, 1913.	Saugus, Mass.	39	—	—	do			

151	July-August, 1913.	Palmer, Mass.	40	do.	40	Explosive. Cases all used H's milk in part or entirety. Inspection of supply farms, revealed no cases. H had employed a milker July 7-20. Very shortly after leaving H farm this helper developed typhoid. 80 per cent of cases on 1 route.	Milker in first stages of disease.	Report Massachusetts State Board of Health, 1913, p. 716.
152	July, 1913.	Troy, Ohio.	40	do.	32	Explosive. 17 of cases on 1 route. Case of typhoid on farm 2 weeks before outbreak. Also case on neighboring farm from which milk was occasionally secured. Dairyman ignorant of possibility of milk becoming infected.	Not stated	Report Ohio State Board of Health, 1913, pp. 774-775.
153	do.	Greenfield, Ind.	20	do.	17	Explosive. 30 cases on route of 1 small dairy. A case of typhoid on farm. Milk shut off, cases developed for 10 days and then rapidly ceased.	Cases on supply farm.	Report Indiana State Board of Health, Bact. & Path. Div. Lab. Hyg., 1916, p. 69.
154	July-August, 1913.	Winchester, Va.	60	Raw milk.	50	Cases on route of 1 of 4 dairymen selling in town. Person who cared for milk had visited and nursed a typhoid case 2 weeks before outbreak. 2 cases developed in dairy during epidemic. Sale of milk stopped and epidemic ceased.	Case on farm.	Report Virginia State Commissioner of Health, 1913, pp. 55-56.
155	do.	Gambier, Ohio.	10	Milk.	10	"Outbreak traced to milk"	Person attending milk who nursed a case of typhoid 2 weeks before onset of epidemic.	Report Ohio State Board of Health, 1913, pp. 770-771.
156	August, 1913.	Chester, Pa.		do.		26 cases on 1 dairy. Undiscovered carrier possibly contaminated supply; 335 cases typhoid in locality in 1912. Dairymen developed typhoid middle of epidemic. Cases on 3 different milk routes. It was found that these dealers were in the practice of exchanging milk. Investigation located a carrier in the person of wife of one of principal dairymen. She had had typhoid 7 years before and several dysentery attacks during summer. Water of town had been placed above suspicion with no decrease in typhoid. Explosive. 20 cases localized in one part of town and on 1 route. Milk the only common factor. No carriers found on farm. Bottles and utensils cooled in grossly polluted water. Infection stopped on cleaning well.	Not stated	Journal American Medical Association 1913, vol. 61, p. 692.
157	August, September, October, 1913.	Coatesville, Pa.	26	do.		28	Carrier on supply farm.	Report State Commissioner of Health, Pennsylvania, 1913, pp. 200-207.
158	August-September, 1913.	Sellersville, Pa.	28	do.			Polluted water used for cooling utensils and bottles.	Annual Report Pennsylvania Commissioner of Health, 1913, Part II, p. 1399.
159	do.	Parsons, Kans.	23	do.	20	Cases on route serving 200 to 250 families. Dairymen and brother had typhoid and milked during prodromal period of illness.	Cases milking during early stages of attack.	Bulletin Kansas State Board of Health, November, 1913, pp. 221-223.
160	September, 1913.	St. Paul, Minn.	15	Raw milk.	15			Biannual Report Minnesota State Board of Health, 1914, p. 183.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
161	September, 1913...	Piqua, Ohio.....	14	-----	14	Raw milk ..	Explosive. Case of typhoid developed on farm 3 weeks before outbreak. Dairy- man nursed case and did milking. 1 dairyman had typhoid several years pre- viously (carrier?). Dairy discontinued and outbreak ceased. Cases all on route supplied by 1 farm.....	Case on farm—milker did nursing.	Report Ohio State Board of Health, 1913, pp. 772-773.
162	.....do.....	Hancock, Md.....	48	-----	48	Milk.....	Explosive. 16 cases on 1 route. 1 case on farm and a convalescent from typhoid doing milking at time of investigation.	Not stated.....	Report Maryland State Board of Health, 1913, p. 114.
163	.....do.....	Fullerton Village, Pa.	17	-----	16	.....do.....	Cases all on 1 route. Dairyman had sold milk to family with typhoid (before diag- nosis). Bottles washed with dishes of patient and refilled without sterilization. Also possibility of spring on farm being contaminated through a carrier among threshers. Explosive. Cases practically all at 1 board- ing house among great milk drinkers. A carrier was located on 1 of supply farms.	Case on farm and con- valescent doing milk- ing.	Annual Report Penn- sylvania Commis- sioner of Health 1913, Part II, p. 1004.
164	September-Octo- ber, 1913.	Richmond, Ind.....	21	-----	21	.....do.....	Daughter of village milk dealer returned from Montreal where typhoid was preva- lent and developed a mild unrecognized case. No typhoid in village prior to this. 4 cases followed among milk customers (no other common factor); 1 of these on premises of a well which became infected and accounts for nearly all remaining cases. Milk probably infected through flies or bottles.	Exchange of infected bottles.	Report Indiana State Board of Health, 1913, pp. 140-143.
165	September, 1913...	Ashokan, N. Y.....	22	-----	22	.....do.....	Explosive. 59 cases on 1 supply which was in part used for ice cream. A pre- sumable carrier who had typhoid in 1912 assisted with milking.	Carrier on supply farm	Annual Report New York State Depart- ment of Health, 1913, p. 743.
166	.....do.....	Fishkill, N. Y.....	19	-----	4	Raw milk...	Daughter of village milk dealer returned from Montreal where typhoid was preva- lent and developed a mild unrecognized case. No typhoid in village prior to this. 4 cases followed among milk customers (no other common factor); 1 of these on premises of a well which became infected and accounts for nearly all remaining cases. Milk probably infected through flies or bottles.	Case in dairyman's family. Bottled milk probably in- fected by flies.	Monthly Bulletin New York Depart- ment of Health, 1914, vol. 9, pp. 12-15.
167	September-Octo- ber, 1913.	Renovo, Pa.....	68	-----	59	Milk and ice cream.	Explosive. 59 cases on 1 supply which was in part used for ice cream. A pre- sumable carrier who had typhoid in 1912 assisted with milking.	Presumably a carrier doing milking.	Report State Com- missioner of Health, Pennsylvania, 1913, pp. 189-200.

166	September-November, 1913.	Ellicottville, N. Y.	9	9	Raw milk	Cases all used cream from B. Proper incubation period followed use of cream in several cases. Polluted well water used to cleanse separator.	Polluted water used to cleanse separator.	Annual Report New York State Department of Health, 1913, pp. 743-749.
169	do.	Manhattan, N. Y.	500		do.	78 per cent of early cases, lower east side, were on 1 route selling raw grade B milk. No carrier or cases found at dairy. Milk ordered Pasteurized. Incidence was at highest during next month (secured evidence of evasion of order). Excess typhoid for period of epidemic was 500 cases—many secondary cases.	Not determined.	The Central Council of the City of New York, New York Medical Journal, 1914, vol. 90, pp. 70-76.
170	September, 1913.	Amesbury, Mass.	5	5	Milk	All cases on 1 route. Wife of milkman first case.	Case on farm.	Massachusetts Department of Health, report special milk board, 1916, p. 259.
171	October-November, 1913.	Chicago, Ill.	48	48	Pasteurized	Cases all on 1 route and largely among those served by 1 of 8 drivers. Driver had typhoid at his home and was in habit of wiping tops of bottles with a rag just before delivery. Same rag was used several days and carried in pocket.	Case in family of wagon driver.	Report Chicago Department of Health, 1911-1913, p. 1014.
172	November, 1913.	Lexington, Mass.	9	9	Milk	Cases on 1 route. 1 of handlers gave positive Widal but no history of typhoid.	Probable carriers handling milk.	Massachusetts Department of Health, report special milk board, 1916, p. 259.
173	November, 1913-January, 1914.	Summit, N. J.	9	9	Raw milk	Cases all on dairy of Mr. B who sold 17 per cent of milk of town; remaining 83 per cent had no cases. Widal made on all handlers of A's milk but no carriers detected. Pasteurization and sterilization of bottles instituted and outbreak stopped. Dealer B had 8 cases on route (1912 total of 17 in 2 years—only 7 cases on other 83 per cent milk sold in city).	Undetermined.	Report New Jersey State Board of Health, 1914, pp. 73-76.
174	1913	Rockford, Ill.	16	16	Pasteurized	"Bottle infection"	Bottle infection	Illinois Health News, August, 1923, vol. 9, p. 241, and E. S. Godfrey, Nation's Health, 1923, vol. 5, pp. 1-6.
175	1913	Eldridge, Md.	6		Milk	"Chiefly carried by milk"	Not stated.	Report Maryland State Board of Health, 1913, p. 114.
176	1913	Mill Creek, Mich.	11		do.	Primary cases all on 1 route. "Milk probably infected by a carrier." Sanitary precautions at dairy checked epidemic. Simultaneous outbreak among users of same bottled milk supply. Origin traced to polluted water supply used for creamery purposes.	Probably a carrier on dairy.	Report Michigan State Board of Health, 1914, p. 48.
177	1913	New York City.			Raw milk		Polluted water used for creamery purposes.	Annual Report New York City Department of Health, 1913, p. 47.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
178	1913	Yakima, Wash.				Milk	Localized milk-borne infection originating from a carrier on a single dairy.	Carrier on farm	Tenth Biennial Re- port Washington State Board of Health, 1913-14, p. 84.
179	1913	Perth Amboy, N. J.	80		80	Ice cream	Trouble traced to wholesaler. Pasteuri- zation remedied difficulty.	Not stated	H. W. Hamilton, American Journal Public Health, 1918, vol. 8, pp. 651-655.
180	January, 1914	Roxbury, Mass.	93		93	Raw milk	Explosive. Cases on 1 route. An active case found on a supply farm.	Case on supply farm	Massachusetts De- partment of Health, report special milk board, 1916, p. 290.
181	February-March, 1914	Providence and Edge- wood, R. I.	19		19	do.	All on 1 route; no source of infection found although distributors received milk from 1 farm where there was a suspected typhoid case which died. Widal was negative.	Not determined	Report Superintend- ent of Health, Prov- idence, R. I., 1914, p. 35.
182	do.	Decatur, Ind.	40-100			do.	Explosive. 20 cases investigated all on route of Mr. R selling 60 gallons in city. R was delivering and collecting bottles from infected homes.	Interchange of infect- ed bottles.	Report Indiana State Board of Health Lab. report, 1914, p. 112.
183	March-April, 1914	Chicago, Ill.	6		6	Milk	Explosive. Cases on route of 1 driver who had been ill from time to time. Widal "probably positive" but record lost.	Driver probably a "walking" case.	Report City of Chi- cago Department of Health, 1911-1918, p. 1015.
184	do.	do.	4		4	do.	Cases on 1 route. First case onset Mar. 16; case on dairy, onset Mar. 25.	In part due to case on dairy.	Do.
185	April-May, 1914	Bridgeton, N. J.	23		18	Raw milk	Explosive. 18 cases on route of Mr. W., who sold 216 quarts of milk (about 6 per cent of city's supply), some cream, cheese, etc. Part of W.'s supply from Mr. D. Discovered that D's son, who had grippie in March, 1914 (in bed 4 or 5 days), was a carrier. This son did milkings.	Milker was a carrier	Report New Jersey State Board of Health, 1914, pp. 67-78.
186	April, 1914	Beverly, Mass.	10		10	Milk	Cases on 1 route. Case on a producing farm.	Case on farm	Massachusetts De- partment of Health, report special milk board, 1916, p. 259.

187	May, 1914.....	Canal Dover, Ohio.....	41	37	Raw milk.....	Explosive. 30 severe cases on 1 route supplying 150 to 170 customers. Case on dairy 11 years ago. Not tested for carrier state. Outbreak on same route in 1910. All cases on 1 route. A case located on a supply farm—improper precautions taken. All cases on 1 route. Helper left dairy ill, probably with typhoid.	A possible carrier on farm.	Annual Report Ohio State Board of Health, 1914, pp. 722-724.
188	May-June, 1914.....	Washington, D. C.....	22	22	Milk.....	Cases all on 1 route. Wife of distributor had been ill; <i>Widal</i> not positive. Case of typhoid located in a neighbor to 1 of supply farms. This case (a relative) was often visited by wife of supply dairyman.	Case on supply farm.	Report Health Officer of District of Columbia, 1914, p. 36.
189	June-August, 1914.....	Providence, R. I.....	9	9	Raw milk.....	Cases on 1 route. Bottles from suspected cases of typhoid being refilled without sterilization.	Attributed to a probable typhoid case on dairy.	Report of Superintendent of Health of Providence, R. I., 1914, p. 35.
190	July, 1914.....	Chicago, Ill.....	8	8	Milk.....	This outbreak only in part due to milk. Primary cases attributed to infection through a bakery. Routes No. 5, No. 27, No. 7, No. 31 showed a disproportionate number of cases. Routes No. 5 and No. 27 together supplying 7.1 per cent of milk had 41.2 per cent of all cases occurring on 32 routes. Exchange of bottles probable means of infection. At dairy No. 27 a child in early stages of typhoid played about milkhouse and at times helped with capping.	Visiting of case by wife of supply dairyman.	Report Chicago Department of Health, 1911-1918, p. 1016.
191	July-August, 1914.....	do.....	5	5	do.....	Cases on 1 route. Milk handler on dairy gave history of indefinite illness; his <i>Widal</i> positive.	Interchange of bottles.	Do.
192	July-November, 1914.....	Rockford, Ill.....	172		do.....	Cases on 1 route. (No other typhoid in town.) Wife of dairyman had had typhoid 8 years previously and probably a carrier, but refused examination. Typhoid occurred in one family where she served as domestic. An epidemic on the same route in 1912.	Cases distributed among 32 routes. Disproportionate number on certain routes attributed to exchange of infected bottles and to infection on farm.	Hanson and Parker, Journal Infectious Diseases, 1915, vol. 16, pp. 1-23.
193	July, 1914.....	Watertown, Mass.....	27	27	do.....	Explosive. Outbreak on 1 milk supply. No illness on any of supply farms. Examination for carriers not made. Polluted wells on several farms.	Case in milk handler.	Massachusetts Department of Health, report special milk board, 1916, p. 259.
194	August-September, 1914.....	Michigan City, Ind.....	8	8	do.....		Wife of dairyman probably a carrier.	Report Indiana State Board of Health, 1914, p. 216.
195	August, 1914.....	York Harbor, Me.....			Raw milk.....		Not determined.	Bulletin Maine Board of Health, vol. 1-3, 1906-1915, pp. 4-44.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
196	August-October, 1914.	Shippachville and vi- cinity, Pa.	108	12	91	Milk	91 cases on 1 route of Mr. T. who pur- chased route about Aug. 1. T. had illness probably typhoid in July. No other common source of infection. Sale of milk stopped and epidemic subsided. Evasive and serious outbreak traced to farm in 1913 and where case occurred during this outbreak 1914.	Probable carrier on farm.	Pennsylvania Health Bulletin, March, 1915, p. 1.
197	August-Septem- ber, 1914.	Portland, Me.				do.	Outbreak on 1 route supplying most of town. Dairyman ill of typhoid at time of this outbreak and wife and daughter had typhoid in 1913. Sanitation at dairy poor. Improvements at dairy resulted in cessation of outbreak.	Possible carrier on farm.	Report Maine State Department of Health, 1914, p. 23.
198	August, 1914.	Pleasant Lake, Ind.				do.	Outbreak on 1 distributor's route who han- dled milk while ill of typhoid.	do.	Report Indiana State Board of Health, 1914, p. 128.
199	do.	North Adams, Mass.	39		36	do.	49 cases on 1 route. Typhoid had occurred during past year on 2 supply farms.	Distributor an active case.	Massachusetts De- partment of Health, report special milk board 1916, p. 259.
200	August-October, 1914.	Johnstown, Pa.	78		49	do.	Cases all on 1 route (many more on same route east of city). Case located on farm.	Possible carriers on farms.	Ninth Annual Report Commissioner of Health of Pennsyl- vania, 1914, Vol. II, p. 1170.
201	August, 1914.	Detroit, Mich.	35		35	Raw milk.	17 cases on 1 route selling about 350 quarts daily. Supply farms in good condition. Infection thought probably due to a carrier at distributor's plant, but not dis- covered. Depot closed.	Case on farm.	V. C. Vaughn, Jour- nal of Laboratory and Clinical Medi- cine, 1915-16, Vol. I, p. 378.
202	August-Septem- ber, 1914.	Cotesville, Pa.	18		17	Milk	Cases widely scattered. Ice cream at church supper the only common source of infection—ice cream a special order shipped from Pennsylvania. Found that manufacturer bought milk from several farms where there had been typhoid.	Not determined.	Ninth Annual Report Commissioner of Health, Pennsyl- vania, Part II, 1914, p. 1117.
203	August, 1914.	Chewsville, Md.	7		7	Ice cream	Probably a case or car- rier on producing farms.		Biennial Report West Virginia State Board of Health, 1915-1916, Vol. 60, July, 1916, p. 136.

204	September, 1914	Newport News, Va.	23	Raw milk	Primary cases all on 1 route. In August a wagon driver developed "malaria," later proved to be typhoid. Brother of this case assumed to be typhoid driver and nursed at night. Uterus washed at farm in grassy polluted water. Probably infected by case.	Wagon driver in early stages of typhoid may have infected milk at farm well. Brother nursed case at night and drove wagon in day time.	Report Commissioner State Board of Health of Virginia 1914, pp. 80-91.
205	September-October, 1914	Danville, Pa.	6	5 Milk	5 cases on 1 route. Daughter of dairymen developed typhoid early in September. She assisted in delivery of dip milk during prodromal stage of attack. Another case developed on farm but after sale of milk was discontinued.	Case on farm.	Annual Report, Pennsylvania State Commissioner of Health, 1914, Vol. II, pp. 1121-1125.
206	September, 1914	New Bedford, Mass.	6	6 do.	Cases on 1 route. Employee in sterilizing plant first case.	Case in milk room.	Massachusetts Department of Health, report special milk board, 1916, p. 259.
207	do.	do.	10	10 do.	Cases on 1 route. Milkman an active case.	Milkman an active case.	Do.
208	do.	St. Paul, Minn.	24	24 do.	Cases on 1 route. Case of typhoid on dairy in July. Second case on farm in September.	Case on farm.	Biennial Report Minnesota State Board of Health, 1914, p. 183.
209	September-October, 1914	Tower City, Pa.	44	37 do.	37 cases wholly or in part used milk from 1 distributor. On 1 insanitary supply farm there had been an undiagnosed illness, probably typhoid, in June. Typhoid in another dairymen's family in September.	Probably a typhoid case on supply farm.	Annual Report Commissioner of Health of Pennsylvania, Part II, 1914, p. 1104.
210	September, 1914	Faribault, Minn.	57	57 Raw milk	Explosive. Every case in a milk drinker using institution supply. Dairymen found to have had walking typhoid. Removal of cases and sterilization of milk promptly checked outbreak.	"Walking" case in dairymen.	Trowbridge, Trinkle and Barnard, Journal American Medical Association, 1915, vol. 64, Feb. 27, pp. 728-731.
211	do.	Greensboro, Md.	13	13 Milk	Cases on 1 route. An unrecognized case found on farm supplying most of town.	Case on farm.	Report Maryland State Board of Health, 1914, pp. 124-125.
212	September-October, 1914	Chicago, Ill.	9	9 do.	Cases on 1 route. No typhoid on any of supply farms. The earliest case of outbreak was in a neighbor who secured milk and returned empty bottles to dairy. Cases local in a portion of city. No source infected in a portion of city.	Interchange of bottles.	Report Chicago Department of Health, 1911-1918, p. 1017.
213	Sept., 1914	do.	50	20 Pasteurized milk	Cases on 1 route. No typhoid on farm. A farm hand who had typhoid in 1913 assisted with milking and was later (in November) found to be carrier.	Not determined.	Do.
214	do.	Hartford, Conn.	12	12 Raw milk	Cases on 1 route, no cases or carriers found on farm. Sanitation at farm poor. Unreported case may have infected bottles.	Milker a carrier.	Connecticut Board of Health Bulletin, November, 1914, Vol. I, p. 8.
215	October-November, 1914	Sidney, Ohio	9	9 do.		Undetermined.	Annual Report Ohio State Board of Health, 1914, p. 735.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
216	October, 1914.....	Auburn, Mass.....	3	-----	3	Milk.....	Cases on 1 route. Utensils washed in polluted water.	Not determined. Pos- sibly polluted water used for washing.	Massachusetts De- partment of Health, report special milk board, 1916, p. 260. Do.
217	.....do.....	Warren, Mass.....	4	-----	3	.....do.....	3 cases on 1 route. Case on dairy.....	Case on dairy.....	Massachusetts De- partment of Health, report special milk board, 1916, p. 269.
218	.....do.....	Leominster, Mass.....	12	-----	12	.....do.....	Explosive. Cases on 1 route. Conva- lescent on farm.	Convalescent on farm.....	Connecticut Board of Health Bulletin, Vol. I, November, 1914, p. 8.
219	.....do.....	Weymouth, Mass.....	19	-----	19	.....do.....	All on 1 route. Source not discovered.....	Not determined.....	Annual Report Penn- sylvania State Com- missioner of Health, Vol. II, 1914, pp. 1125, 1126.
220	November, 1914.....	Hartford, Conn.....	34	-----	34	Raw milk.....	Cases on 1 route. At farm a new milk- er was employed 4 weeks before outbreak. This milk found to be a carrier.	One of milkers a car- rier.	Biennial Report Iowa State Board of Health, 1915-16, pp. 109-121.
221	November-De- cember, 1914.....	Danville, Pa.....	11	-----	10	Milk.....	Explosive. 10 cases used wholly or in part milk from 1 dairy. No other com- mon source of infection. No typhoid on farms. Bottles returned from house of a recovered case ill in August.	Possibly due to ex- change of bottles.	
222	.....do.....	Adel, Iowa.....	18	2	18	.....do.....	Town free from typhoid fever for a long time. Cases wholly among attendants at a church supper. Infection traced to chicken salad made with milk from Mr. W's farm. Well on farm polluted. Cattle pastured in field along stream much frequented by fishermen. Possi- bility of cow becoming infected in stream or through soilage of pasture by a carrier. Cases on route of Mr. G. A carrier found on 1 of supply farms. This supply dis- continued and G. required to Pasteurize and outbreak ceased.		
223	.....do.....	Providence and Edge- wood, R. I.....	21	-----	21	Raw milk.....	Utensils washed in polluted water.....	Carrier on farm.....	Report, Providence, R. I., Board of Health, 1914, p. 36.
224	1914 (fall).....	Burlington, Vt.....	22	-----	22	Milk.....		Polluted water used for washing utensils.	C. F. Whitney, Bulle- tin Vermont Board of Health, 1916, Vol. 17, p. 19.

225	do	Brooklyn, N. Y.	30			Ice cream	Outbreak traced to carrier in an ice cream parlor.	Carrier in ice cream parlor.	R. Blatter, Medical Record of New York, 1913, Vol. 88, p. 1028.
226	December, 1914	Manhattan, Kans.	20	1		Milk	Outbreak at State Agricultural College attributed to a certain milk supply.	Not stated.	H. W. Hamilton, American Journal of Public Health, 1918, Vol. 8, pp. 681-683.
227	1914	Swampscott, N. H.	13		13	Raw milk	Cases on 1 route. Father of dairyman had typhoid and secured milk from son. Families close neighbors.	Father of dairyman ill; of typhoid. Family closely neighbored	Eight Biennial Report Kansas State Board of Health, 1914, p. 13.
228	1914	Lima, Ohio		5		Milk	Cases on 1 route. Active case on dairy	Case on dairy	Report New Hampshire State Department of Health, 1915-16, Vol. 24, p. 102.
229	1914	Philadelphia, Pa.	9		9	Ice cream	Cases all used ice cream from one dealer. Dealer operating over a broken sewer.	Possibly through broken drain pipe.	Journal American Medical Association, 1914, vol. 65, p. 1483.
230	1914	Indianapolis, Ind.	14		14	Milk	Family with case typhoid purchased milk and returned bottles to grocer who refilled bottles without sterilization.	Exchange of infected bottles.	Annual Report Philadelphia Bureau of Health, 1914, p. 141.
231	1914	Barre, Vt.	20		20	do	Cases traced to 1 employee at a single dairy.	Employee at dairy	Journal American Medical Association, 1914, vol. 65, p. 789.
232	1914	Junction, Utah	30		30	Ice cream	All cases had eaten ice cream at a social. Ice cream prepared by a woman who had typhoid year before. Examination for carrier state not reported.	Ice cream prepared by a possible carrier.	Report Vermont State Board of Health, 1916, vol. 13, p. 19.
233	1914	Orange County, N.Y.	32		32	do	Cases used ice cream made of cream from dairy of Mr. G. who was later proved to be a carrier. This supply caused outbreak of 40 cases in 1915.	Carrier on dairy	Report Utah State Board of Health 1913-14, p. 40.
234	January-February, 1915.	Cleveland, Ohio	5	1	5	Raw milk	Explosive. Cases on 1 route. Man who removed cans from train had wife at home ill with typhoid. This man opened can daily and secured milk for himself, using cup from his dinner pail as dipper.	Cup from infected home used to dip milk from cans.	State Department of Health of New York Monthly Bulletin, 1916, Vol. II, pp. 110-111.
235	February-March, 1915.	Chicago, Ill.	29		29	do	Explosive. Cases on 1 route supplying 232 customers. Widal, urine, and feces examinations on dairy employees negative. Bottles from infected home refilled without sterilization.	Interchange of infected bottles.	Don. B. Lowe, Journal American Medical Association, 1915 vol. 65, p. 1797.
									Report Chicago Department of Health 1911-1918, p. 1017.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
226	March, 1915.....	Lynn, Mass.....	23	—	23	Milk.....	All cases on 1 route. Source not deter- mined.	Not determined.....	American Journal Public Health, 1920, vol. 10, p. 72.
227	March-June, 1915.	Chambersburg, Pa....	31	—	31	do.....	Cases on routes of 13 milk men, each of whom received all or part of their supply from the C. V. creamery. Creamery closed and last case appeared 8 days later.	Undetermined.....	Tenth Annual Report Pennsylvania Com- missioner of Health, 1915, p. 1388.
228	March-October, 1915.	Mansfield, Mass.....	46	—	46	do.....	Cases on 1 route. Carrier on farm who had had typhoid 45 years previously	Carrier on farm.....	American Journal Public Health, 1920, vol. 10, p. 72.
229	May, 1915.....	Colusa, Calif.....	23	—	23	do.....	Explosive. Cases all on 1 of 2 dairies sup- plying city. No carriers found on re- peated search at dairy or substation. Water at substation grossly polluted through a semipublic open privy 20 feet from shallow well. This water used for rinsing bottles.	Contaminated water used for rinsing bot- tles and utensils.	American Journal Public Health, 1920, vol. 10, p. 72.
240	do.....	Grafton, Mass.....	22	—	22	do.....	Cases in Grafton Insane Colony and all on 1 milk supply. Festive Widal found in a milkster and in 2 kitchen helpers.	Probably carrier in milkster.	American Journal Public Health, 1920, vol. 10, p. 72.
241	May-June, 1915....	Lewiston, Pa.....	17	—	17	do.....	Cases on 1 route. Open privy and many fines on farms. Milk not properly safe- guarded from latter. Dairyman had had typhoid in 1906; he was found to be a carrier in November when a small out- break occurred on his route.	Dairyman a carrier....	Tenth Annual Re- port Pennsylvania Commissioner of Health, 1915, p. 1460.
242	May-November, 1915.	Lake City, Iowa.....	14	2	10	Raw milk....	10, and possibly 13, cases used milk from dairy selling 5 per cent of city's supply. Cases in 1 part of town mainly in chil- dren and old people. Dairyman had typhoid in 1890 and wife in 1900; they left community before investigation.	Probably unproved carriers on farm.	Eighteenth Biennial Report Iowa State Board of Health, 1915-16, pp. 205-208.
243	May-June, 1915....	Maryland, Tubercu- losis Sanitarium.	27	3	27	Milk.....	Cases among those using milk from 1 of 7 dairymen supplying institution. Wife of dairymen suffered an unrecognized attack of typhoid in April. Sale of milk stopped and outbreak ended.	Unrecognized cases on farm.	Report State Board of Health Maryland, 1915, p. 128.

244	June-August, 1915	Martinsburg, W. Va.	5+	---	All.	Ice cream....	All cases had used ice cream from one restaurant. Ice cream made in part from milk from farms having typhoid. Sale of this ice cream stopped and outbreak ceased.	Milk from infected farms used in ice cream.	Report West Virginia State Board Health, July, 1915-July, 1916.
245	June-July, 1915	Negunee, Mich.	42	4	17	do	17 primary cases all ate ice cream from an 8-quart freezer at a church supper on May 30; onset of primary cases 10 to 21 days later. Ice cream made of milk from 6 different farms. On 1 farm 9 cases of typhoid had occurred in 1902 and nearly every one living in apartment or boarding with family since had had typhoid. 25 secondary cases due to flies.	Probably carrier on farm.	E. L. Waterman, Michigan Department Public Health 1917, vol. 5, p. 157.
246	do	Pottsville, St. Clair, and Port Carbon, Pa.	24	---	16	Milk.	16 on routes of 2 dairymen on adjacent farms who exchanged supplies and sold in the neighboring towns. 4 cases of typhoid, last in 1906, had occurred on supply farms. These proved negative to test for carriers. Wife of 1 dairyman developed typhoid in June; she handled milk in early stages of attack and probably infected milk.	Undetermined for early cases. Later cases probably due in part to typhoid in dairyman's wife.	Tenth Annual Report Pennsylvania Commissioner of Health, 1915, p. 1456.
247	July, 1915	Newburyport, Mass.	11	---	7	do	7 cases on 1 route. Dairyman ill, probably with typhoid. Thorough test not permitted.	Producer probably an active case.	American Journal of Public Health, 1920, vol. 10, p. 72.
248	do	Gardner, Mass.	4	---	4	do	Cases on 1 supply. Milker found to be a carrier.	Milker a carrier.	Do.
249	July - September, 1915.	Swissvale, Pa.	31	---	24	do	24 cases on 1 route, no carriers found on dairy. Bottles from first case of series were daily removed to dairy and refilled; same practice employed with a later case. Public water supply excluded. Outbreak traced to pasteurized milk supply from New Jersey. No typhoid found at plant. Well badly polluted and probably caused infection through the bottle filler after pasteurization. Milk from this source discontinued and epidemic promptly stopped.	Exchange of infected bottles.	Tenth Annual Report Pennsylvania Commissioner of Health, 1915, p. 1471.
250	July, 1915	Brooklyn, N. Y.	112	---	---	Pasteurized milk.	Cases on 1 route selling 14 cans daily. A carrier located on supply farm who had previously caused infection of 3 milk supplies.	Polluted water used on bottle filler.	Annual Report New York City Board of Health, 1915, p. 80.
251	August-September, 1915.	Providence, R. I.	26	0	26	Raw milk.	Explosive. Cases on several routes supplied by 1 dairy. Carrier found on 1 supply farm and case in next house to another, with open privy and milk house accessible to flies.	Carrier on supply farm.	Report Providence, R. I., Superintendent of Health, 1915, pp. 56, 57.
252	August, 1915	do	56	4	56	do		Carrier on supply farm, case in adjoining house.	Report Superintendent of Health, Providence, R. I., 1915, pp. 54-56.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
253	August, 1915.....	Auburn, N. Y.....	18	-----	16	Raw milk.....	16 cases on 1 route selling milk from 13 farms. A case of typhoid discovered on 1 of supply farms in a dairyman whose son had typhoid in 1914. Sale of milk from this farm prohibited and remainder of distributor's supply Pasteurized. Last case occurred within the incubation period following.	Case and possible carrier on supply farm.	F. W. Sear, New York State Department of Health Monthly Bulletin, 1915, vol. 10, pp. 375, 376.
254	August-Septem- ber, 1915.....	Mackinac Island, Mich.	10	-----	10	do.....	Cases on 1 supply, mainly in vacationists who were milk drinkers. A carrier with bacilli in both urine and feces found on farm washing milk bottles. Files numerous and milk shed but 20 feet from open privy.	Carrier on farm washed milk bottles.	Pub. Health, Michigan State Board of Health, 1916, pp. 80-88.
255	do.....	Bel Air, Md.....	5	-----	5	Milk.....	Cases on 1 route. First case in a boy who continued to deliver milk for 5 days after onset of his illness.	Case in delivery boy.	Report Maryland State Board of Health, 1915, p. 128.
256	August-October, 1915.....	York, Pa.....	90	-----	-----	Ice cream.....	Nearly all cases had used ice cream from one manufacturer. In rural sections it was found cases had nearly all used this supply at picnics. Rural sections free of typhoid had not used this supply. 76.7 per cent of cases between 5 and 36 years of age.	Not determined.	Tenth Annual Report Pennsylvania Commissioner of Health, 1915, p. 1473-1484.
257	September-Octo- ber, 1915.....	"P." in South Cen- tral, Iowa.....	10	1	9	Milk.....	9 primary cases all ate butter made from raw cream from a farm where typhoid had existed earlier in year. No test for carrier state. Youngest case, 14. Other usual sources failed to explain outbreak.	Probable carrier on farm.	M. F. Boyd, Journal American Medical Association, 1917, vol. 69, p. 203.
258	do.....	Gallup, N. Mex.....	65	-----	61	Raw milk.....	Explosive. 61 cases on route of 1 farm, 41 under 18 years of age. Flood carried collection of city sewage to farm below town.	Infection of dairy farm by sewage of town due to flood.	F. C. Smith, Annual Report United States Public Health Service 1916, pp. 39, 40.
259	October, 1915.....	Northbridge, Mass.....	22	-----	22	Milk.....	Cases on 1 route; active case on farm.	Case on farm.	American Journal of Public Health, 1920, vol. 10, p. 72.
260	Oct. 15, 1915.....	Roehdale, Mass.....	18	-----	18	do.....	Cases on route of 1 of 5 dairymen of town who sold daily 175 quarts. At farm a milkster who juddled the milk had been ill of "malaria" but continued to work. His Widal was positive.	Unrecognized "walk- ing" case on farm.	Report State Board of Health, Massachu- setts, 1915, p. 724.

261	October, 1915	Cedar Rapids, Iowa.	10	10	10	Raw milk	Explosive. Cases on 1 route selling 1 per cent of population, all in best residential section. City free of typhoid during summer. Wife of dairymaid had typhoid in 1901 and dairy secured small amount of milk from Mrs. H., who had typhoid in 1904. Carrier tests planned but not reported.	Possible carriers on farm.	Eighteenth Biennial Report State Board of Health, Iowa, 1915-16, pp. 200-202.
262	November, 1915	Richmond, Calif.	12	0	12	do	Explosive. Cases on route dairy A selling 90 gallons daily. Richmond. At dairy it was found that the best milk developed typhoid about Oct. 19 and was removed to hospital Oct. 26.	Milk developed typhoid on farm.	J. C. Geiger and F. J. Kelley, Journal American Medical Association, vol. 66, pp. 263-264.
263	do	Quincy, Mass.	7		7	Milk	Cases on 1 small route.	Not stated.	American Journal of Public Health, 1920, vol. 10, p. 73.
264	1915 (fall)	Barre, Vt.	20		20	do	Infection traced to case on 1 dairy.	Case on dairy.	Bulletin Vermont State Board of Health, Dec. 1, 1916, vol. 17, p. 19.
265	do	Burlington, Vt.	12		12	do	Explosive. Cases on 1 route. Focus of infection not found.	Not determined.	Do.
266	November, 1915	Sir Johns Run, W. Va.	6		6	Raw milk	Cases used milk from 1 family and all under 6 years of age. Wife of dairymaid had typhoid in June, 1915.	Possible carrier on farm.	Report West Virginia State Board of Health, July, 1915-July, 1916, pp. 252-254.
267	December, 1915-January, 1916	Fall River, Mass.	38		38	Milk	Cases on 1 route. Dealer found to be delivering bottles to homes in other towns where typhoid existed. Bottles imperfectly sterilized before refilling. No cases or carriers on farm but well was polluted.	Exchange of infected bottles.	Report Massachusetts State Board of Health, 1916, p. 521.
268	do	Flint, Mich.	90			do	Explosive. Cases largely on 1 route. Cows allowed to wade in polluted river below city. Since September a family had been employed on dairy and examination showed several of them to be carriers. Milk sale stopped and epidemic subsided.	Carriers on farm. Cattle wading in river below sewage outlet.	Report Michigan State Board of Health, July, 1915-July, 1917, p. 37.
269	1915	Greenwich, N. Y.	21		21	do	Cases on 1 route. Case on farm mistaken for tuberculosis. Sale of milk stopped and outbreak ceased.	Unrecognized case on farm.	Report New York State Department of Health, 1915, vol. 1, p. 101.
270	1915	Somersworth, N. H.	23		23	do	Cases on route of Mr. A. A's father, neighbor to A, and who bought milk of A was found to be a carrier. 2 families closely neighbored. This is second outbreak traced to this source.	Carrier in father who lived close neighbor to dairy.	Report New Hampshire State Board of Health, 1915-16, p. 102.
271	1915	Philadelphia, Pa.	23		23	do	Cases traced to milk from an unsanitary dairy.	Not stated.	Annual Report Philadelphia Bureau of Health, 1915, p. 146.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
272	1915.....	Harvey, Ill.....	29	—	—	Milk.....	Outbreak traced to a single depot and thence to a dairy at Manteno, where a case of typhoid had existed just a short time before.	Case on supply farm.	Illinois Health News, vol. 1, 1915, p. 165, and Journal American Medical Association, 1915, vol. 65, p. 537.
273	1915.....	Orange County, N. Y.	40	—	40	do.....	Cases on route of P. who quietly bought 2 cans of milk daily from G. whose sale of milk was ordered stopped. G. was a carrier; his supply had caused an outbreak of 32 cases in 1914 through ice cream and he had been under suspicion since 1909.	Carrier on supply farm.	Monthly Bulletin State Department of Health, New York, 1916, Vol. II, pp. 116, 111.
274	1915.....	Gallup, N. Mex.....	9	—	—	Ice cream.....	Epidemic traced to dairy selling milk and ice cream. 2 cases Holbrook traced ice cream same source.	Not stated.....	H. W. Hamilton, American Journal of Public Health, 1918, vol. 8, pp. 661-665. Do.
275	1915.....	Brooklyn, N. Y.....	9	—	9	do.....	Traced to ice cream from same establishment causing outbreak in 1914. A carrier found in plant.	Carrier in plant.....	Jas. G. Cumming, Journal American Medical Association, 1917, vol. 68, p. 1163.
276	May, 1916.....	Helm, Calif.....	23	3	23	do.....	Explosive. 29 people attended a picnic from 5 to 12 days. Every person eating chocolate ice cream, with 2 exceptions, developed typhoid fever. Some of the affected ate nothing else. No other common factor and other articles could be eliminated as causes. Woman who prepared ice cream had typhoid 17 years previously and was found to be a carrier. Cases all on 1 route. The fifth case of outbreak was a child on the dairy.....	Carrier prepared ice cream.	
277	do.....	Clinton and Lancaster, Mass.	11	—	11	Milk.....		Not determined. Case on dairy may have contributed to outbreak.	Report Massachusetts State Department of Health, 1916, p. 519.
278	June, 1916.....	Whitman and East Bridgewater, Mass.	5	—	5	do.....	Cases on route of man who had typhoid 30 years previously. Found to be a carrier.	Dairymen a carrier.....	Report Massachusetts State Board of Health, 1916, p. 521.

279	June-July, 1916	Birmingham, Ala.	451	Ice cream.	Explosive. Cases number 330 more than average for the period. Cases on all milk routes in proper proportion. It was found that about 35 per cent of cases had used, within 3 weeks, ice cream from 1 manufacturer furnishing 20 per cent of supply. Milk supply for ice cream purchased from infected territory. Exceptionally severe epidemic originated in a dairy.	Probably infected on supply farm.	L. L. Lumsden, Southern Medical Journal, 1916, vol. 9, pp. 711-714.
280	1916 (summer)	Ann Arbor, Mich.	Many	Milk.	Explosive. Cases confined to small area about an ice cream factory making and selling on the premises 18 to 20 gallons weekly. 48 of cases had eaten this ice cream. 70 per cent of cases were females and 62 per cent between 6 and 19 years of age. The first case of outbreak occurred at ice cream plant.	Not stated.	Report Michigan State Board of Health, 1916-17, p. 78.
281	July, 1916	Altoona, Pa.	52	Ice cream.	Explosive. Cases confined to small area about an ice cream factory making and selling on the premises 18 to 20 gallons weekly. 48 of cases had eaten this ice cream. 70 per cent of cases were females and 62 per cent between 6 and 19 years of age. The first case of outbreak occurred at ice cream plant.	Case at ice cream plant.	Eleventh Annual Report Pennsylvania Commissioner of Health, 1916, p. 1567.
282	July, 1916-April, 1917	Bakersfield, Calif.	22	Milk.	These cases occurring at intervals for 9 months baffled authorities until it was discovered that Mr. D. was occasionally disposing of a little home-bottled milk to several distributors. D.'s family had a terrific typhoid history; his wife was found to be a carrier of 28 years' standing. 21 of cases used ice cream from Harrisburg. This same supply accountable for serious outbreak in central and southeastern part of State.	Carrier on small supply farm.	H. F. Seftner, Journal American Medical Association, 1917, vol. 68, p. 1893.
283	July-September, 1916	Mahanoy City, Pa.	23	Ice cream, "Pasteurized holding."	36 cases on 1 route; 10 secondary cases. Cases confined to well-to-do part of the city. Source of infection not given.	Not determined.	Eleventh Annual Report Pennsylvania Commissioner of Health, 1916, p. 1567.
284	do.	Newton, Iowa	46	Raw milk.	Cases on 1 route. 3 carriers discovered on dairy.	Not stated.	Biennial Report Iowa State Board of Health, 1917-18, pp. 142, 143.
285	July-August, 1916	Decatur, Mich.	54	do.	Carrier found on farm supplying milk to cases.	Carriers on dairy.	Report Michigan State Board of Health, 1916-17, p. 82.
286	August, 1916	Nantucket, Mass.	9	Milk.	All on 1 supply. Bottles returned from a family with typhoid for about 10 days before outbreak began. Bottles not sterilized.	Carrier on farm.	Report Massachusetts State Department of Health, 1916, p. 321.
287	August-September, 1916	New Berlin, Ohio	16	Raw milk.	At least 7 of cases ate ice cream at barber shop. This ice cream probably from Harrisburg and of same make as that causing outbreak at Mahanoy City, Pa. Other factors excluded.	Exchange of infected bottles.	Ohio Public Health Journal, 1916, vol. 7, p. 464.
288	do.	Stony Creek Mills, Pa.	9	Ice cream, "Pasteurized holding."		Not determined.	Eleventh Annual Report Pennsylvania Commissioner of Health, 1916, p. 1565.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
289	August—Septem- ber, 1916.	Lynn, Mass.	114	---	114	Raw milk	Explosive. Cases on 1 route selling 1,650 quarts daily. Open privy and polluted well on farm. Supply discontinued and outbreak stopped.	Undetermined. Open privy and polluted well on farm are possible sources.	Annual Report Massachusetts State Department of Health, 1916, pp. 508, 509.
290	September—Octo- ber.	Winchester, Va.	73	---	56	Ice cream	Of 76 cases reported for town and county 56 had used ice cream from 1 establishment selling to whites only. 73 of cases were in whites. Water supply common to colored and whites. At a children's party practically every child who ate ice cream developed typhoid.	Not determined	Annual Report Virginia State Commissioner of Health, 1916, Vol. VIII, p. 73.
291	do.	Schuylkill Haven, Pa.	21	---	---	do.	Outbreak attributed to ice cream from Harrisburg, Pa. Same as caused typhoid elsewhere.	do.	Eleventh Annual Report Pennsylvania Commissioner of Health, 1916, p. 16. Do.
292	September—Octo- ber, 1916.	Shenandoah, Pa.	51	---	36	do.	36 of cases remembered eating ice cream at restaurant during incubation period. Ice cream frozen at restaurant. Cream from some creamery at Harrisburg that was held responsible for typhoid in several localities. Use of this cream discontinued and outbreak ceased.	do.	
293	do.	Bryan, Ohio	27	---	27	Raw milk	Cases on 1 route of dairy totally unfitted for production of pure milk.	Not stated	Ohio Public Health Journal, 1916, vol. 7, p. 464.
294	do.	Canal, Dover, and New Philadelphia, Ohio.	12	---	12	Milk	Cases on 1 route. No other common source.	do.	Do.
295	October—Novem- ber, 1916.	Morristown, N. J.	11	---	11	Raw milk	Cases on route 1 driver distributing milk from 1 supply farm. 2 carriers located on this farm.	Cases on farm.	C. F. Bolduan and C. Krumwiede, Public Health Report 1917, vol. 32, p. 1755.
296	do.	Elko County, Nev.	17	---	16	Milk	16 cases on 1 route. Owner had had typhoid 8 years previously and had positive Widal at time of investigation. Well on farm polluted.	Carrier and polluted well on farm.	Biennial Report Nevada State Board of Health, 1915-16, pp. 29-31.

297	October, 1916	Harrisburg, Pa.	122	do.	Traced to products of a creamery company.	Not stated.	Journal American Medical Association, 1916, vol. 67, p. 1237.
298	1916	Providence, R. I.	9	do.	Traced to milk.	do.	Report, Providence Superintendent of Health, 1916-1922, p. 42.
299	1916	Baltimore, Md.		Raw milk	Minor epidemic due to raw milk.	do.	Journal American Medical Association, 1916, vol. 67, p. 1109.
300	1916	Richmond City, N. Y.	19	Milk	Cases traced to milk.	do.	Annual report New York City Department of Health, 1917, p. 73.
301	1916	Bronx, New York City.	55	Pasteurized milk.	Pasteurized in village with bad typhoid record.	do.	E. S. O'Driscoll, National's Health, 1923, vol. 8, pp. 1-4.
302	February, 1917	Minnesota	3	3	3 cases on small supply—woman aged 69, who conducted dairy and had bad typhoid 19 years previously, found to be a carrier. Neighbor in 1906 had 2 cases of typhoid, probably through same supply.	Carrier on dairy	Seventh Minnesota State Board of Health, 1917, p. 311.
303	April, 1917	St. Louis, Mo.	35	3	Explosive. Cases on 1 route. 74 per cent under 16 years of age. No carriers or source of infection located on producing farm or in distributor's personnel. Outbreak attributed to bottle infection. All on 1 route. Typhoid bacilli isolated from a milk.	Exchange of bottles	S. T. Lipsitz, Journal Missouri State Medical Association, 1917, vol. 14, pp. 418-421.
304	April-September, 1917	Gardner, Mass.	80	80	Milk	Carrier on supply farm.	E. R. Kelley, American Journal Public Health, 1920, vol. 10, p. 72.
305	May-July, 1917	Bath, Mich.	51	4	Cheese	Green cheese—milk probably infected on farms.	E. D. Rich and C. E. Fellow, American Journal Public Health, 1923, vol. 13, pp. 210-215.
306	do.	Decatur, Ill.	100		Milk	Milk bottles.	Illinois Health News, vol. 9, August, 1923, p. 241.
307	June, 1917	Marshfield, Mass.	5	5	do.	Cases used milk from same farm. Typhoid bacilli isolated from feces of a milker.	E. R. Kelley, American Journal of Public Health, 1920, vol. 10, p. 72.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
308	July, 1917	Millbrook, N. Y.	22	1	22	Raw milk	Explosive. Cases on 1 of 2 routes selling 400 quarts daily. 2 carriers found on 1 of producing farms—a woman, 72, who had had typhoid at 12, and her daughter, who has recovered from the disease on this farm.	Carriers on 1 of supply farms.	Report New York Department of Health, 1917, vol. 1, pp. 172-174.
309	July-August, 1917	Chattanooga, Tenn.	75		70	Ice cream	Explosive. 70 cases had eaten particular kind of ice cream. Cases mainly among "well-to-do," 30 per cent of cases 5 to 15 years of age. There were opportunities for infection at both farms and factory. Mixture supposedly pasteurized by flash method before freezing, but not always done.	Not stated	L. L. Lumsden, American Journal of Public Health, 1917, vol. 7, pp. 1005-1006.
310	do	Ridgeby and Chicago, Md.	7			Milk	Outbreak attributed to a milk-cooling station.	do	Report Maryland State Board of Health, 1917, p. 107.
311	August, 1917	Greenwood, Miss.	35		25	do	25 cases in excess of average. Mainly due to milk from 1 farm.	do	Annual Report U. S. Public Health Service, 1918, p. 32.
312	August-September, 1917	Hazelton Township, Iowa.	8		8	Butter and butter-milk.	Cases all used butter or buttermilk from a single lot of infected raw cream produced on a farm with case of typhoid.	Case on farm	Biennial Report State Board of Health of Iowa, 1917-18, pp. 158-160.
313	September, 1917	Mount Vernon, Iowa.	8		8	Milk	7 cases on route of distributor with case in family—1 case secured milk from dairyman with 3 cases in family.	Cases on dairies	Biennial Report Iowa State Board of Health, 1917-18, pp. 164, 165.
314	October, 1917	Delmar, N. Y.	14		14	Raw milk	Explosive. 3 cases developed on 1 of supply farms (undiagnosed), 14 cases followed on route of distributor selling this milk. Sale discontinued and outbreak stopped.	Cases on supply farm	Report New York State Board of Health, 1917, Vol. I, pp. 174, 175.
315	October-November, 1917	Woodstock, Va.	15	1	15	do	Explosive. Cases on 1 route selling 50 per cent of town's supply. A case developed on farm early in epidemic; no precautions taken. Unsterilized bottles probably played important part. Sale prohibited and outbreak stopped.	Case on dairy and exchange of bottles.	Annual Report Virginia State Board of Health, 1917, pp. 130-132.

	December, 1917-January, 1918.	Iowa City, Iowa.	5	5	5	Milk.	Milk infected by a carrier.	Carrier.	Biennial Report Iowa State Board of Health, 1917-18, p. 169.
316									
317	1917.	Minnesota.	4		4	do.	Cases secured milk from woman who had typhoid in 1901; probably a carrier. From 1901 to 1916, inclusive, 21 cases occurred among patrons of this small dairy. Several cases on 1 route. Dairyman a carrier of 40 years' standing. Over 70 cases traced to this carrier in 2 years.	Probably carrier on dairy.	Seventh Biennial Report Minnesota Board of Health, 1917, p. 312.
318	1917.	Bordersdown, N. J.				do.		Carrier on dairy.	Report New Jersey State Board of Health, 1917, p. 50.
319	1917.	Vermont.	6		6	Raw milk.	Cases in summer home where dairyman was found to be a carrier of 9 years' standing. In all, 15 cases were traced to this man.	Dairyman a carrier.	Bulletin Vermont State Board of Health, December, 1917, vol. 18.
320	1917-18 (winter).	Pierce, W. Va.	14	1	14	do.	Cases all secured milk from barber who was nursing 2 cases and milking 3 cows. Every home supplied by this milk developed typhoid.	Milker nursing typhoid cases.	Annual Report West Virginia State Board of Health, 1917-18, pp. 35, 36.
321	1917.	Richmond, New York City.	69			Milk.	Cases traced to infected milk supply.	Not stated.	Annual Report New York City Department of Health, 1917, p. 25.
322	1917.	Staten Island, N. Y.	65			Pasteurized milk.	A driver with 2 cases in family.	Not definitely located.	E. S. Godfrey, Nation's Health, 1923, vol. 5, pp. 1-6.
323	1917.	St. Louis, Mo.	25			Ice cream.	Traced to eating ice cream at a dance.	Not stated.	H. W. Hamilton, American Journal Public Health, 1918, vol. 8, pp. 651-656.
324	January-March, 1918.	Ely, Nev.	11		11	Raw milk.	Cases on 1 route. A convalescent case of typhoid hired at the dairy and in 15 days cases appeared among patrons. Typhoid recovered from helper's stools.	Carrier on farm.	C. F. Ruediger, Journal Infectious Diseases, 1918, vol. 25, pp. 346-350.
325	February, 1918.	Westminster, Mass.	2		2	Milk.	Cases used milk from same farm. Milker found to be a carrier.	Milker a carrier.	American Journal of Public Health, 1920, vol. 10, p. 72.
326	April, 1918.	New York City.	6		6	do.	Cases all used milk from dairy at Gravesville. A carrier discovered at plant.	Carrier in milk plant.	Annual Report Department of Health, New York City, 1918, p. 114.
327	April-May, 1918.	Woburn, Mass.	6		6	do.	Cases on 1 small route. 1 of customers found to be a carrier.	Exchange of infected bottles.	American Journal Public Health, 1920, vol. 10, p. 73.
328	August-September, 1918.	Wallingford, Conn.	18		18	Ice cream.	Explosive. Cases all ate freely of ice cream from local source. No other common factor. Manufacturer of ice cream had been ailing for 3 weeks before outbreak and gave positive Widal. Stools negative on 1 examination.	"Walking" case at ice cream factory.	Report Connecticut State Board of Health, 1919-20, pp. 69, 70.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
329	August, 1918.	Wheaton, Ill.	18		Milk	On 1 route. Carrier on farm.	Carrier on farm.	Illinois Health News, August, 1923, vol. 9, p. 241. Journal of American Medical Association, 1918, vol. 71, p. 915.
330	do.	Marlboro, Mass.	30	30	do.	Cases on 1 route. Carrier on farm.	do.	American Journal of Public Health, 1920, vol. 10, p. 73.
331	August-Septem- ber, 1918.	Downingtown, Pa.	100		Ice cream	Traced to eating ice cream manufactured in West Chester, Pa.	Not determined.	Report State Com- mission of Health, Pennsylvania, 1918, F. W. Fabian.
332	August-Novem- ber, 1918.	Wilmington, Mass.	10	10	Milk	Cases on 1 route.	do.	American Journal of Public Health, 1920, vol. 10, p. 73.
333	September, 1918.	Athol, Mass.	8	8	do.	Cases on 1 route. 1 milker gave posi- tive Widal, but denied having had ty- phoid. No typhoid found in stools.	Milker a probable carrier.	Do.
334	October, 1918.	Beverley, Mass.	30	30	do.	Cases on 1 route. Suspected carrier on a supply farm.	Possible carrier on farm.	Do.
335	do.	Gloucester, Mass.	6	6	do.	Cases on 1 route. Carrier on farm.	Carrier on farm.	Do.
336	December, 1918.	Moline, Ill.	55		do.	Due to carrier.	A carrier.	Illinois Health News, August, 1923, vol. 9, p. 241.
337	1918.	Danville, Ill.			do.	Epidemic traced to 2 sources of city milk supply.	Not stated	Journal American Medical Association, 1918, vol. 71, p. 479.
338	1918.	Oneonta, N. Y.	15		do.	Cases traced to milk infection.	do.	Report State Board of Health, New York, 1918, Vol. I, p. 87.
339	1918.	Southport, N. Y.	7		do.	Cases used milk from a 2-cow dairy on which there was a typhoid case.	Case on dairy.	Do.
340	1918.	Utica, N. Y.	28		do.	Traced to milk.	Not stated.	Do.
341	1918.	Ilion, N. Y.			do.	Small milk outbreak.	Carrier on farm.	Do.

342	1918.....	Moore Mill, N. Y.	14	8	27	do.....	Traced to a carrier on a dairy farm.	do.....	Do.
343	January-April, 1919.	Missoula, Mont.	38			Raw milk.....	27 primary cases traced to 1 milk supply. Milker found to be a carrier. Carrier removed and outbreak stopped.	Carrier doing milking.	Report Montana State Board of Health, 1919-20, p. 59.
344	February-March, 1919.	Jacksonville, Ill.	12			Milk.....	Due to a carrier.....	Carrier.....	Illinois Health News, August, 1923, vol. 9, p. 241.
345	May-June, 1919.	Hyndsville, N. Y.	7			Ice cream.....	Ice cream at a picnic the only common source. Ice cream from 2 homes—1 of which had a marked typhoid history. Carrier found on this farm.	Carrier on farm.....	Fortieth Annual Report New York State Department of Health, 1919, vol. 1, p. 61.
346	September, 1919.	Hagerstown, Md.	44		33	Milk.....	A urinary carrier at dairy handling milk.	Carrier at dairy.....	Annual Report Maryland State Board of Health, 1919, p. 115.
347	September-October, 1919.	Port Jefferson, Setauket, and East Setauket, N. Y.	29		21	do.....	Explosive. 21 cases all on 1 route largely among milk drinkers. A carrier suspected on farm, but none found.	Not determined.....	Fortieth Annual Report New York State Department of Health, 1919, vol. 1, p. 58.
348	do.....	Shortsville, N. Y.	9	1	9	do.....	Explosive. Cases on route sole distributor for village, all among customers who received milk from 1 of 2 supply farms. At this farm a milker who had typhoid 30 years previously was employed Aug. 25 to Sept. 19. This man was found to be a carrier. The first case of outbreak occurred on this supply farm.	Carrier doing milking.	Annual Report New York State Department of Health, 1919, vol. 1, p. 57.
349	do.....	Woodrider Township, Ill.	6			do.....	Dairy.....	Not stated.....	Illinois Health News, August, 1923, vol. 9, p. 241.
350	October-November, 1919.	Worcester, Mass.	25	3	25	do.....	Explosive. Cases on 1 route selling 20 per cent of milk of city. Investigation of 39 supply dairies revealed 8 previous cases, 1 of whom was proven to be a carrier. This carrier supplied 20 to 100 quarts daily. Investigation disclosed a marked typhoid history in this family and among milk customers extending over several years.	Carrier on supply farm.	E. B. Bigelow and G. L. Berg, Boston Medical and Surgical Journal, 1920, vol. 182, pp. 431-432.
351	April, 1920.	Niagara University, N. Y.	30			do.....	Carrier employed as milker.....	Milker a carrier.....	Report New York State Board of Health, 1920, vol. 1, p. 13.
352	May, 1920.	Cadillac, Mich.	28		25	do.....	25 cases on 1 route; 3 probably used same supply occasionally.	Not determined.....	Report Michigan State Board of Health, years ending June 30, 1921, and June 30, 1922, p. 28.

TABLE 10.—Typhoid fever—Continued

Number of outbreak	Date	Locality	Number of cases	Number of deaths	Number of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of infection	Reference
353	June-July, 1920	Mattoon, Ill.	30	—	—	Milk	Due to carrier	Carrier	Illinois Health News, August, 1923, vol. 9, p. 241.
354	July, 1920	Fountain Green, Ill.	75	—	75	Ice cream	Ate ice cream at church supper. No other common source of infection.	Not stated	Report Illinois Department of Health, Health News, 1921, vol. 7, p. 11.
355	do	Chelsea, Mass.	18	—	—	Milk	Not stated	do	E. R. Kelley, W. G. Webber, American Journal of Public Health, 1924, vol. 14, pp. 963-966.
356	August-September, 1920	Enfield, Conn.	36	—	30	do	Explosive. 30 primary cases all on 1 route. A bottler, while ill of typhoid, worked from Aug. 21 to Sept. 8.	Active case in a bottler.	Thirty-seventh Report Connecticut State Department of Health, 2 years ending June 30, 1922, pp. 82-86.
357	do	Tuscola, Ill.	30	—	—	do	Carrier (?)	Carrier (?)	Illinois Health News, August, 1923, vol. 9, p. 241.
358	August, 1920	Redlands, Calif.	11	—	—	do	Milk-borne epidemic	Not stated	Report California State Board of Health, 1920-1922, p. 35.
359	1920	Hartford, Conn.	4	—	4	Pasteurized milk	Cases on route of driver found to be a carrier.	Wagon driver a carrier.	E. S. Godfrey, Nation's Health, 1923, vol. 5, pp. 1-6.
360	August, 1920	Hastings, Mich.	9	—	9	Milk	Explosive. All used milk from a cow allowed to wade in creek just below outlet of a sewer.	Soiling of cow with polluted creek water.	Report Michigan State Department of Health, 1921-22, p. 32.
361	September, 1920	Omaha, Nebr.	10	—	10	do	Cases on 1 route. Sale of milk stopped and outbreak ceased immediately.	Not stated	Journal American Medical Association, 1920, vol. 75, p. 1000.
362	do	Bishop, Calif.	65	—	—	do	Milk-borne outbreak	do	Report California State Board of Health, 1920-1922, pp. 33-35.

363	do	Piqua, Ohio	59		Raw milk	Traced to milk of a certain dairy. Dairy used contaminated water and not properly screened.	do	Ohio Public Health Journal, 1920, vol. 11, pp. 182-183.
364	do	Ipswich, Mass.	33		Milk	Not stated.	do	E. R. Kelley and W. G. Webber, American Journal of Public Health, 1924, vol. 14, pp. 963-964.
365	October, 1920	Hillsdale, Mich.	83	8	do	All on 1 route. First case of outbreak was in dairymen's son. Dairymen had had mild cases diagnosed as "Grippe" and was found to be a carrier.	Carrier and case on farm.	Report Michigan State Department of Health, 1921-22, p. 32.
366	do	Susanville, Calif.	26		do	Milk-borne epidemic.	Not stated.	Report California State Board of Health, 1920-1922, p. 35.
367	November, 1920	Georgetown, Ohio	7	7	do	Cases on 1 supply which obtained milk from a farmer whose sons were recovering from typhoid.	Cases on supply farm.	Ohio Journal of Public Health, 1919, vol. 10, p. 429.
368	December, 1920	Village "D," Minn.	11	11	Raw milk	Cases on 1 route. 8 children and 3 adults. Wife of dairymen found to be a carrier. She handled milk and utensils.	Carrier on farm.	J. N. Gehlen, Journal American Medical Association, 1922, vol. 79, p. 516.
369	1920	Waterville, Me.	10	0	Milk	Cases on 1 supply. 4 active cases on dairy preceding outbreak.	Active cases on dairy.	Bulletin Maine State Department of Health, 1920, vol. III, p. 305.
370	1920	Lakewood, N. J.	9	1	Milk	Cases on 1 supply farm. 2 carriers found on dairy.	Cases and carriers on farm.	Report New Jersey State Department of Health, 1920, p. 34.
371	1920	Hillsdale Township, N. J.	17	2	Raw milk	"Cases definitely traced to raw milk"	Not stated.	Report New Jersey State Department of Health, 1921, p. 36.
372	1920	Chatham and Livingston Township, N. J.	7	6	do	"Due to raw milk"	do	Do.
373	1920	Oswego, N. Y.	7	7	Milk	Cases on small milk supply. Carrier discovered.	Carrier on dairy.	Report New York State Department of Health, 1920, vol. I, p. 13.
374	1920	Connecticut	7	7	do	Cases on 1 route. Carrier suspected but not discovered.	Not determined.	Connecticut Health Bulletin, August, 1920, p. 4.
375	1920	do	3	3	do	Cases on small supply. Bottles washed on premises of a case for many days before diagnosis was made.	Case on premises where bottles were washed.	Do.
376	January-July, 1921	Decatur, Ill.	10		do	Carrier or convalescent.	Carrier or convalescent.	Illinois Health News, August, 1922, vol. 9, p. 241.
377	January, 1921	Greenville, Ill.	8		do	Source unknown.	Not determined.	Do.

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
378	March-April, 1921.	Baldwinville, N. Y.	21	—	21	Raw milk.	Cases on 1 route. Carrier on dairy.	Carrier on dairy.	Forty-second Annual Report, New York State Department of Health, 1921, vol. 1, p. 878.
379	April-May, 1921.	Hartford, Conn.	45	—	—	Ice cream "Pasteurized holding."	Nearly all had eaten "N" ice cream. This was the only common factor. 32 cases paratyphoid on same supply. Outbreak at Pine Plains, N. Y., attributed to same ice cream.	Not determined.	Thirty-seventh annual report State Department of Health of Connecticut, 2 years ending June 30, 1922, pp. 153-168.
380	April, 1921.	Danbury, Conn.	9	—	7	Milk.	7 on 1 supply. 2 contact cases. No carriers found on farm.	do.	Thirty - seventh annual report State Department of Health of Connecticut, 2 years ending June 30, 1922, p. 87.
381	May, 1921.	South Haven, Mich.	—	—	—	do.	Several cases; all secured milk from a 1-cow dairy. All members of dairyman's family had typhoid within the past 14 years. Examination disclosed one carrier.	Carrier on dairy.	Report Michigan Department of Health, 2 years ending June 30, 1922, p. 39.
382	do.	Waltham, Mass.	135	—	—	do.	Not stated.	Not proved.	E. R. Kelley, W. G. Webber, American Journal of Public Health, vol. 14, pp. 963-966.
383	do.	Kewanee, Ill.	25	2	25	Raw milk.	Cases on 1 route. Carrier who looked after the milk located on 1 of supply farms had suffered with an undiagnosed typhoid attack 7 years previously.	Carrier on farm.	Annual report Illinois State Department of Health, 1920-21, pp. 181-182.
384	May-June, 1921.	Lexington, Ky.	26	—	21	do.	21 cases on 1 route. "Source found on a farm supplying this depot." Faults corrected and outbreak soon stopped.	Source on dairy.	Annual report U. S. Public Health Service, 1922, p. 29.
385	May, 1921.	Meriden and Wallingford, Conn.	4	—	4	Milk.	Cases on 1 route. Active case washing and filling bottles. Case removed and outbreak ceased.	Active case washing and filling bottles.	Thirty - seventh report State Department of Health of Connecticut, 2 years ending June 30, 1922, p. 86.

386	May-June, 1921	Beacon, N. Y.					Traced to route with carrier on farm.	Carrier on farm.	Forty - second annual report of New York State Department of Health, 1921, p. 78.
387	July, 1921	Snohomish, Wash.	6		6	do.	All cases on 1-cow supply. Carrier on dairy had washed bottles and utensils for 3 weeks before outbreak. She denied having typhoid but husband and three children had it 27 years previously.	Carrier.	First biennial report, Washington State Department of Health, 1921-22, p. 69.
388	1921 (summer)	Northern County, Ill.	3			do.	3 people secured raw milk from farm where 4 people were ill of typhoid. All 3 developed the disease. This same dairy shipped milk to Chicago where it was pasteurized. No trouble known to have developed from it there.	Cases on dairy.	Illinois State Department of Health, Health News, 1922, vol. 8, pp. 192-193.
389	1921 (summer)	Woonsocket, R. I.	34			do.	"Outbreak traced to a definite milk supply."	Not stated.	Forty - second annual report of Rhode Island State Board of Health, 1921, p. 11.
390	August - September, 1921.	Jacksonville, Ill.	8			Milk	"Convalescent(?)"	"Convalescent(?)"	Illinois Health News, August, 1923, vol. 9, p. 241.
391	do	Syracuse, N. Y.	90			Raw milk	Outbreak traced to incipient case on supply farm.	Case on farm.	Report New York State Department of Health, 1921, vol. 1, p. 78.
392	do	Hartford and Windsor, Conn.	25		25	do.	Cases on 1 route. No carrier found. Dairy had supplied case taken ill on July 18 and outbreak began Aug. 16.	Case among customers.	Thirty-seventh Report State Department of Health of Connecticut, 2 years ending June 30, 1922, p. 87.
393	August, 1921	Bryn Mawr, Pa.	31		31	Milk	Cases on 1 route.	Not stated.	Journal American Medical Association, 1921, vol. 77, p. 795.
394	September, 1921	Hartford, Conn.	8		8	Pasteurized milk.	Cases on 1 route in customers of 1 driver. He was found to be a carrier.	Wagon driver a carrier.	Thirty - seventh Report State Department of Health of Connecticut, 2 years ending June 30, 1922, pp. 86-87.
395	do	Northport, Wash.	10		10	Milk	Cases on 1 route. A "walking" typhoid case found on farm handling the milk.	Case on farm.	First Biennial Report Washington State Board of Health, 1921, p. 69.
396	do	Natick and Sherborn, Mass.	6			do.	Not stated.	Not proved.	E. R. Kelley, W. G. Webber, American Journal Public Health, 1924, vol. 14, pp. 963-966.
397	September - October, 1921.	Milford, Mass.	12			do.		do.	Do.
398	do	Fitchburg, Mass.	8			do.		Carrier.	Do.

TABLE 10.—Typhoid fever—Continued

Number of outbreak	Date	Locality	Number of cases	Number of deaths	Number of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of infection	Reference
399	October, 1921.....	Fort McPherson, Ga.	9	---	9	Raw milk....	Cases among 160 users of milk from a local dairy. Among 76 vaccinated, 1 case; and among 84 not vaccinated, 8 cases. Cases of typhoid in dairy since August.	Cases in dairy.....	A. T. Cooper, N. F. Curtis, and R. Skelton, Military Surgeon, March, 1922, pp. 283-294.
400	do.....	Elmira, N. Y.	33	---	---	do.....	Transmission traced to a "walking" case on dairy.	do.....	Forty-second Annual Report New York State Department of Health, 1921, Vol. 1, p. 78.
401	November, 1921...	Beacon, N. Y.	---	---	---	do.....	Traced to milk supply infected by carrier on dairy. Same carrier infected milk in May and June.	Carrier in dairy.....	Do.
402	December, 1921...	Mount Carroll, Ill.	5	---	---	Milk.....	Due to carrier, typhoid 43 years previously.	Carrier.....	Illinois Health News, August, 1923, vol. 9, p. 241.
403	1921.....	Pawtucket and Central Falls, R. I.	23	---	---	Raw milk....	Outbreak traced to 1 supply.....	Not stated.....	American Medical Association, 1921, vol. 77, p. 2006.
404	1921.....	Canby, Minn.	6	---	6	Pasteurized milk.	Unrecognized case in family of proprietor of milk plant. Milk heated 160° in "Starter can" and cooled. Not sold as Pasteurized.	Unrecognized case in family of milk-plant proprietor.	Forty-second Annual Report Rhode Island State Board of Health, 1921, p. 11.
405	1921.....	St. Charles township, Kane County, Ill.	11	3	---	Raw milk....	Cases on 1 route. Same dealer sold milk to Chicago where milk was Pasteurized. No outbreak there.	Not stated.....	E. S. Godfrey, Nation's Health, 1923, vol. 5, pp. 1-6.
406	1921-1924.....	Eureka, Calif.	6	---	6	do.....	Every case in Eureka, 1921-1924, had used milk from a 2-cow dairy. Proprietor a carrier.	Carrier in dairy.....	Journal American Medical Association, 1921, vol. 77, p. 1249.
407	January, 1922.....	Norwich, Conn.	9	---	9	Milk.....	Cases on 1 route. Cans washed in spring which received gross pollution through an underdrain from cesspool of neighbor.	Polluted water used to wash cans.	Weekly Bulletin California Board of Health, June 7, 1924, vol. 3, p. 66.

Thirty-seventh Report Connecticut State Department of Health, 2 years ending June 30, 1922, p. 151.

408	May, 1922..	Kewanee, Ill.	25	2	25	Raw milk..	Explosive. All cases on 1 route selling 400 quarts daily. Well on farm grossly polluted. A carrier found on 1 of supply farms who handled milk. Sale of milk stopped and outbreak stopped. Carrier found on farm who had typhoid 28 years previously.	Polluted well on farm. Carrier on 1 of supply farms.	Illinois Health Department, Health News, 1922, vol. 8, pp. 197-199.
409	July, 1922	Connecticut.....	6	---	6	Milk.....	Carrier found on farm who had typhoid 28 years previously.	Carrier on farm.....	Journal American Medical Association, 1922, vol. 79, p. 480.
410	August - September, 1922.	Greenville, Ill.....	25	---	---	do.....	Explosive. "Evidence pointed to 1 of principal milk supplies."	Not stated.....	Illinois Health Department, Health News, August, 1923, vol. 9, p. 241.
411	1922 (summer).....	Washington township, Morris County, N. J.	70	2	---	Raw milk..	On 1 route. Milk produced on premises of a carrier who handled milk.	Carrier on producing farm.	Report New Jersey State Dept. of Health, 1922, p. 40.
412	September - December, 1922.	Newark, N. J.....	35	3	35	Milk.....	Carrier employed on dairy. Same carrier caused outbreak in Morris County, N. J.	Carrier on farm.....	Nation's Health, March, 1923, vol. 5, p. 172.
413	September, 1922.....	Canas, Wash.....	23	3	23	do.....	All used milk from 1 dairy. Unrecognized case found on supply farm. Privy used by patient and milk house open to flies.	Unrecognized case on supply farm.	First Biennial Report Washington State Department of Health, 1921-22, p. 70.
414	October, 1922.....	Pullman, Wash. (State college).	61	1	61	do.....	60 of cases dined in 1 hall. Milk thought to be contaminated through flies or an unrecognized carrier. The milk at this dormitory stood all day at room temperature. Milk from same supply served at 2 other dormitories, but properly fed and no cases developed. Dairyman found to be a fecal carrier of 29 years' standing. Removal of gall bladder cured patient.	Possibly flies or carrier.	P. Do.
415	November, 1922.....	Oxford County, Maine.	1	---	1	do.....	Carrier in dairy.	Carrier in dairy.....	C. B. Sylvester and A. W. Sylvester, Journal American Medical Association, 1923, vol. 85, p. 111.
416	December, 1922.....	Independence, Kans.	---	---	---	do.....	Carrier in dairy.	do.....	Twelfth Biennial Report Kansas Board of Health, 1924, p. 16.
417	1922.....	Milton, Mass.....	8	---	---	do.....	"Due to carrier infecting a milk supply" ..	Carrier.....	Annual Report Massachusetts Department of Health, 1922, p. 18.
418	1922.....	Trenton and Ewing township, N. J.	59	1	---	Raw milk..	"Traced to raw milk." Ambulatory case on farm.	Case on farm.....	Report New Jersey State Department of Health, 1922, p. 40.

TABLE 10.—*Typhoid Fever*—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
419	1922	New York City	7		Ice cream	Traced to contaminated ice cream	Not stated	Annual Report New York City Depart- ment of Health, 1922, p. 90.
420	1922	Wichita, Kans.			Milk	Milk-borne epidemic	do	Eleventh Biennial Report Kansas State Board of Health 1922, p. 76.
421 422	1922 February, 1923	Almena, Kans do			do do	do Carrier on farm	do Carrier on farm	Do. Twelfth Biennial Re- port Kansas State Board of Health, 1924, p. 16
423 424	March, 1923 April-May, 1923	Osage City, Kans Newman, Ill.	10	10	do do	2 carriers on farm. Cases on 1 route. A carrier found on pro- ducing farm. Suffered typhoid attack 80 years previously.	2 carriers on farm. Carrier in dairy	Do. Illinois State Depart- ment of Health, Health News, 1923, vol. 9, p. 241.
425	1923 (summer)	Jamestown, N. Y.			do	Evidence pointed to 1 dairy. Investiga- tion disclosed a carrier on farm.	do	New York State De- partment of Health, Health News, May, 1924, vol. 1, p. 13.
426	August, 1923	Coffeyville, Kans.			do	Carrier in dairy	do	Twelfth Biennial Re- port Kansas State Board of Health, 1924, p. 34.
427	September, 1923	New Haven, Conn.	29	29	Raw milk	Cases on 1 route supplying 1 per cent of city. 1 para A carrier found on a supply farm. (1 para A cases found, but others tested were typhoid.) 1 person on sup- ply farm had typhoid. 1 year before, not proven to be a carrier. Milk Pas- teurized and outbreak ceased.	Not determined	Connecticut Health Bulletin, 1923, De- cember, vol. 37, No. 12, p. 3.
428	do	Newburyport, Mass.	18		Milk	Not stated	Not proved	E. R. Kelley, W. G. Webber, American Journal Public Health 1924, vol. 14, pp. 963-966.
429	October-Novem- ber, 1923	Taunton, Mass.	11		do	do	Carrier	Do.

430	Second half, 1923	Rural, Va.	7	7	do.	Boy returned from town ill of typhoid; he milked for a few days; 7 of family became ill almost simultaneously.	Case on farm—milk.	G. C. Payne and Henry P. Carr, Virginia Medical Journal, 1924, vol. 51, pp. 363-364. Do.
431	do	do	13	2	Raw milk	A carrier infected 1 of family through a case, then assisted family in milking; 13 out of 14 of family developed typhoid. Traced to milk.	Carrier.	Virginia State Board of Health Biennial Report, 1924-1925, vol. 17, p. 62.
432	November, 1923	Nuttsville, Va.	5	5	Milk		Not stated.	Wm. H. Pritchard, Thirteenth Report, International Association of Dairy and Milk Inspectors, 1925, pp. 60-88.
433	December, 1923	Iowa	41	38	Raw milk	38 cases on 1 route in town of 7,500 people.	do	Journal American Medical Association, 1923, vol. 80, p. 116.
434	1923	Queens Village, N. Y.	27	2	Ice cream	Spread through ice cream served at a festival.	do	New York State Department of Health, Quarterly, April, 1924, vol. 1, p. 32.
435	1923	Rochester, N. Y.			Pasteurized milk.	Probably caused by an unrecognized case employed in the Pasteurizing plant. He handled the bottled product subsequent to Pasteurization.	Case in Pasteurizing plant. Handled bottles subsequent to Pasteurization.	New York State Department of Health, Quarterly, April, 1924, p. 33.
436	1923	Kingston, N. Y.			Milk	"Milk borne"	Not stated.	L. L. Lumsden, Public Health Reports, 1925, vol. 40, pp. 1302-1316.
437	January and February, 1924	Harrogate, Tenn.; Lincoln Memorial University.	100	8	Raw milk	Cases among 300 students who ate at 1 mess hall where portion of milk (16 gallons daily) were from a very insanitary farm where the dairymen had typhoid. Polluted run water used to wash utensils. Milk eliminated until sanitation and Pasteurization put in effect; epidemic quickly checked.	Case on producing farm. Contaminated water used on utensils.	H. J. Sears, R. W. Garhart, and D. W. Mack, American Journal of Public Health, 1924, vol. 14, pp. 848-854.
438	March, 1924	Portland, Oreg.	26	5	do.	Cases on 1 route supplying 175 families—not very explosive. Urinary carrier 70 years of age found on farm. No history of his having had typhoid. Pasteurization checked outbreak.	Carrier on farm	J. L. Rice, Fourteenth Annual Report, International Dairy and Milk Inspectors, 1925, pp. 51-61.
439	do	do	26		do.	Cases on 1 route	Not stated.	Health News, New York State Department of Health, Apr. 14, 1924.
440	Spring of 1924	South Corning, N. Y.	5		Milk	Cases on 1 milk supply.	do	

TABLE 10.—Typhoid fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
441	April, 1924	Graham, Va.	10		8	Milk	Cases on 1 supply. Cows waded in stream used for sewer by people living above dairy. Case stream in February 10 milk, above dairy. Water for utensils from an "undoubtedly polluted" spring.	Cows wading in pol- luted stream. Pol- luted spring water used for utensils.	Virginia State Bd. Health Biennial Re- port, 1924-25, pp. 60-65.
442	June and July, 1924	Bath, Me.	45	4	44	do	44 cases on 1 route. Fecal carrier employed on farm for 11 days before outbreak be- gan to develop.	Carrier on farm	Journal American Medical Associa- tion, 1924, vol. 83, p. 1173.
443	July, 1924	Columbia, Mo.	22	0	22	Raw milk	Carrier of 10 months standing bottled and capped milk.	Carrier bottled and capped milk.	A. D. Dulaney, Amer- ican Journal Public Health, 1925, vol. 15, pp. 885-886.
444	August, 1924	Plattsburg, N. Y.	4		4	do	4 cases on 1 route; 3 cases found on produc- ing farm. Milk produced under most approved methods, which was thought to have limited the number of cases.	3 active cases on farm.	Health News, New York State Depart- ment of Health, Sept. 23, 1924, p. 152.
445	Summer and fall, of 1924.	Greenville, Ill.	25			Milk	Milk supply shut off and epidemic ceased.	Not stated	Health News, Illinois State Department of Public Health, 1924, vol. 10, p. 26.
446	Fall of 1924	Litchfield, Ill.	14		14	do	Cases had all used milk from 1 dairy sup- plied through 2 restaurants.	2 carriers found on pro- ducing farm.	Journal American Medical Associa- tion, 1924, vol. 83, p. 926.
447	1924, first outbreak	Wisconsin				do	Traced to a carrier	Traced to a carrier	W. D. Stovall, Wis- consin Medical Journal, 1925, vol. 24, pp. 261-262.
448	1924	Port Jefferson, Long Island, N. Y.	28		28	Raw milk	Cases on 1 route. Case discovered on dairy.	Active case on dairy	Health News, New York State Depart- ment of Health, Aug. 25, 1924; Jour- nal American Medi- cal Association, 1924, vol. 83, p. 620.
449	1924, second out- break.	Wisconsin				Milk	Traced to a carrier	Traced to a carrier	W. D. Stovall, Wis- consin Medical Journal, 1925, vol. 24, pp. 261-262.

450	1924	Florence township, N. J.	6	6	do	Cases on 1 supply. Contaminated water used on utensils.	Presumably from infected water used on utensils.	Forty-eighth Report State Department of Health, New Jersey, 1925, p. 26.
451	1924, third outbreak.	Wisconsin			do	Traced to milk	Not proven	W. D. Stovall, Wisconsin Medical Journal, 1925, vol. 24, pp. 261-262.
452	1924	New York State	2		Raw milk	Cases in 1 family served by dairy where a carrier and 2 cases were found. Carrier had his attack many years before. He occasionally handled milk.	Carrier and 2 cases on producing farm.	Health News, New York State Department of Health, Apr. 28, 1924
453	1924	Newman, Ill.	12		Milk	Traced to a carrier of over 50 years' standing found in dairy.	Carrier in dairy	Health News, Illinois State Department of Public Health, 1924, vol. 10, p. 26.
454	1924	Fitchburg, Mass.	10		do	Milk dealer and an employee suffering with typhoid.	2 active cases in milk handlers.	Journal American Medical Association, 1924, vol. 85, p. 1231.
455	1924	Tulare County, Calif.	3		do	Cases on 1 route. Carrier of 20 years' standing found in dairy.	Carrier in dairy	Weekly Bulletin California State Board of Health, 1924, vol. 3, p. 6.
456	July, 1925	Greenwich and Fort Edward, N. Y.	5		do	Explosive. Cases on 1 milk supply. Carrier of 16 years' standing (fecal) found on farm.	Carrier on producing farm.	Health News, New York State Department of Health, 1925, vol. 2, p. 137.
457	do	Allen County, Kans.	15		Ice cream	Cases all ate ice cream at a picnic	Not stated	Journal American Medical Association, 1925, vol. 85, p. 751.
458	August, 1925	Litchfield, Ill.	20		Milk	Traced to 2 carriers in a dairy	2 carriers in a dairy	Health News, Illinois State Department of Public Health, 1925, vol. 11, p. 72.
459	do	Battle Creek, Mich.	12		do	9 cases traced to 1 dairy; 3 cases imported	Not stated	Journal American Medical Association, 1925, vol. 85, p. 831.
460	do	York, Pa.	57		Pasteurized milk	An unreported case in dairy ill 23 days before discovered. Milk delivered to Pasteurization plant where weighman is thought to have infected hands with raw milk and then to have infected bottles which he removed from filler. Pasteurization above suspicion.	Raw milk from farm with active case handled by a man who removed bottles of Pasteurized milk from filler. The presumption is that he carried infection to the Pasteurized product.	Pennsylvania Association of Dairy and Milk Inspectors, second annual report, 1926, p. 60; Ibid. pp. 105-106.

TABLE 10.—*Typhoid fever*—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
461	October, 1925.....	Western New York State.	24	-----	24	Milk.....	Cases on 1 route. Carrier found on farm who sometimes washed bottles. She gave no history of typhoid.	Carrier on producing farm washed bottles.	Health News, New York State Depart- ment of Health, Dec. 21, 1925. Do.
462	December, 1925....	Central New York State.	2	-----	2	Raw milk....	Carrier who had typhoid, March, 1925, delivered milk of 1 cow to a family which developed 2 cases of typhoid. Milk from 40 cows sold to Pasteurizing plant but no cases developed on this supply.	Carrier of 9 months' duration on produc- ing farm.	
463	.....do.....	Lancaster, Pa.....	21	-----	-----	Milk.....	Cases mainly on 1 route.....	Carrier suspected.....	Journal American Medical Associa- tion, 1926, vol. 86, p. 357.
464	.....do.....	Poland, N. Y.....	15	2	15	Raw milk....	Cases on 1 route; 4 cases on producing farm.	Active cases on farm....	Health News, New York State Depart- ment of Health, Feb. 22, 1926.
465	1925.....	Coffeyville, Kans.....	20	-----	-----	Milk.....	Carrier employed on farm.....	Carrier on farm.....	Journal American Medical Associa- tion, 1925, vol. 85, p. 731.
466	1925.....	Knorrville, Tenn.....	6	-----	6	Raw milk....	Cases on 1 route selling only 10 gallons. Carrier found on farm. Pasteurization instituted, epidemic stopped.	do.....	J. L. Rice, Fourteenth Annual Report In- ternational Associa- tion Dairy and Milk Inspectors, 1925, pp. 51-61.
467	1925.....	Florence Township, Burlington Coun- ty, N. Y.....	6	-----	-----	Milk.....	Traced to milk.....	Presumably due to polluted water used for washing utensils.	Forty-eighth Annual Report, State De- partment of Health, New York, 1925, p. 25.
468	1925.....	Knorrville, Tenn.....	15	-----	15	Raw milk....	Cases on dairy selling 125 gallons per day. Pasteurization begun and epidemic ceased.	Not stated.....	J. L. Rice, Fourteenth Annual Report In- ternational Associa- tion Dairy and Milk Inspectors, 1925, pp. 51-61.

469	1925	Sandusky, Ohio	60	60	do	Cases on 1 route	do	Journal American Medical Association, Oct. 3, 1925, vol. 85, p. 1070.
470	1925	Montgomery, Pa	50	49	do	Unreported case on a dairy farm worked with milk for 29 days before taken to hospital. Removal of case and cutting off milk supply until sterilization effected, stopped outbreak.	Walking case on farm.	Pennsylvania Association Dairy and Milk Inspectors, second annual report, 1925, pp. 60-61.
471	1925	St. Mary's, Pa	18	2	Milk	Milk infected by a developing case on a dairy farm.	Developing case on farm.	Pennsylvania Association Dairy and Milk Inspectors, second annual report, 1926, p. 60.
472	1925	Scott Township, Columbia County, Pa	8		do	Infection traced to a dairy farm, apparently to a visiting carrier.	Apparently due to a carrier visiting on a dairy.	Do.
473	January-February, 1926	Denver, Colo	40		Raw milk	Explosive. 38 cases traced to 1 supply which was in part secured from a ranch where manager had typhoid. Part of same milk sold to a Pasteurizing dairy and no typhoid resulted.	Active case on supply ranch.	Journal American Medical Association, 1926, vol. 86, p. 1219.
474	March-April, 1926	Calverton, Calif	67	67	do	Cases on 1 route. Missed case found on farm. Pasteurization instituted and outbreak ceased.	Case on farm	Journal American Medical Association, 1926, vol. 86, p. 1297.
475	March and April, 1926	Westfield, N. J			do	Probably typhoid fever in a dairy employee.	Unrecognized case in a dairy worker.	Public Health Reports, 1927, vol. 42, p. 11.
476	Fall of 1926	Wellington, Ohio	149	14	Milk	Carrier found in dairy. Same carrier caused outbreak in Sandusky, 1925.	Carrier in dairy	Journal American Medical Association, 1927, vol. 88, p. 108.
477	September, 1926	Elwood, Ind	25	25	do	All cases in 1 dairy	Not stated	Journal American Medical Association, 1926, vol. 87, p. 1300.
478	1926	Salem, Ill	25		do	Case in dairy	Case in dairy	Health News, Illinois State Department of Health, 1926, vol. 12, p. 79.
479	1926	Sanger, Calif	11		do	Traced to milk. Dairy closed.	Not stated	Journal American Medical Association, 1927, vol. 88, p. 36.

TABLE 11.—*Paratyphoid fever*

No. of outbreak	Date	Locality	Number of cases	Number of deaths	Number of cases using same milk	Type of milk	Origin and circumstances of outbreak	Probable source of infection	Reference
1	September-October, 1912.	Newton, Mass.	25	1	25	Raw milk.	Cases on 1 route; 15 cases tested and all gave positive agglutination with para A. A walking case located on a supply farm, in July-October. Milk sale stopped and outbreak ended.	Case on farm.	F. G. Curtis, American Journal Public Health, 1913, vol. 3, pp. 1311-1314.
2	November, 1914.	Ames, Iowa.	11	—	10	do.	Explosive. 10 cases on 1 route all in milk drinkers, 7 under 14 years of age. Sera agglutinable for para B. A carrier found on the distributing dairy.	Carrier on distributing dairy.	M. Levine and F. Ebersson, Journal Infectious Diseases, 1916, vol. 18, pp. 143-166.
3	Summer, 1918.	"Village," southern Illinois.	110	12	—	do.	Explosive. Every case on 1 route or had used the milk. An ambulatory case of paratyphoid B found on the supply farm.	Case on farm.	Report Illinois State Department Health, Health News, 1922, vol. 8, pp. 188-194.
4	August, 1920.	Fountain Green, Ill.	100	—	—	Ice cream.	Cases among users of chocolate ice cream served at a church social. (Type not stated.)	Not stated.	Journal American Medical Association, 1920, vol. 75, p. 482.
5	April-May, 1921.	Hartford, Conn.	32	—	—	do.	Ice cream common to nearly all cases. No source of infection found, but it was thought to be due to food products added to the cream in manufacture. (Type B.)	Undetermined.	Thirty-seventh Report Connecticut State Department of Health, 2 years ending June 30, 1922, pp. 135-156.
6	March-April, 1921.	University of Minnesota, Minneapolis, Minn.	106	2	103	Milk, bulk, Pasteurized.	Explosive, 103 cases had had 1 or more meals at Men's Union Cafeteria during incubation period. 86 cases in males. Blood 92 cases tested and positive for <i>B. paratyphosus</i> B. Same organism from urine or feces of 21 cases. 4 carriers, 2 who had had no symptoms found in cafeteria. Rat virus considered, but no connection with outbreak established.	Carriers in cafeteria.	E. M. Wade and O. McDaniell, Journal American Medical Association, 1921, vol. 83, pp. 1417.
7	March-April, 1924.	New Rochelle, N. Y.	50+	—	50+	Milk, certified.	Explosive. Cases on 1 supply mainly among children. A worker found to be a fecal carrier (Type B.)	Milker a carrier.	Huntington Williams, Journal American Medical Association, 1925, vol. 84, pp. 251-253.

TABLE 12.—*Dysentery and diarrhea*

No. of out-break	Date	Locality	Number of cases	Number of deaths	Number of cases using same milk	Type of milk	Origin and circumstances of outbreak	Probable source of infection	Reference.
1	Midwinter, 1907....	New York City.....	5	3	5	Milk.....	Hiss-Russell type. Cases on 1 supply. Milk supply changed and no new cases developed.	Not stated.....	Hans Zinsser. Proceedings New York Pathological Society, 1908, new series 6-7, pp. 162-164.
2	1912.....	New Haven, Conn.....	.....	.....	.....	do.....	Milk borne epidemic of infantile diarrhea.	do.....	Report New Haven Health Department 1912, p. 23.
3	August, 1914.....	Virginia City, Nev.....	47	.....	28	do.....	Explosive. 28 of 38 cases investigated on 1 route supplying one-third of town. 20 under 5 years of age. Milk only common factor. First case was on route of dairyman Y, and on Aug. 7 case occurred at dairy. Utensils stored beneath water-closet, both exposed to flies.	Cases on dairy utensils and water-closet open to flies.	Biennial Report Nevada State Board of Health, period ending Dec. 31, 1914, pp. 30-35.
4	July, 1916.....	Haverhill, Mass.....	20	2	20	Raw milk.....	Cases on a route supplying 75 people. First case followed by 6 others, occurred on producing farm. 2 milkers worked throughout the attacks.	Cases on producing farm.	Annual Report Massachusetts Department of Health, 1916, pp. 486-490.
5	July-August, 1921..	Port Chester, N. Y.....	20	.....	20	do.....	Cases on 1 route. 2 severe cases diarrhea found on one of 9 supply farms.	Cases on supply farm.	Thirty-seventh Report Connecticut State Department of Health, 1921, p. 127.
6	1925.....	Allegheny County, Pa.....	.....	.....	.....	do.....	A number of cases of diarrhea. Streptococci and <i>B. welchii</i> found in milk.	Not stated.....	Pennsylvania Association Dairy and Milk Inspectors Second Annual Report, 1926, p. 61.

TABLE 13.—*Septic sore throat*

Num- ber of out- break	Date	Location	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
1	April, 1908.....	Cambridge, Mass..	200	-----	200	Milk.....	Outbreak among students eating at one hall. Examination of milk showed presence of streptococci.	Not stated.....	Report special milk board, Department of Health of Massachusetts, 1916, p. 255.
2	December, 1911- January, 1912.	Chicago, Ill.....	10,000	19	-----	Pasteurized milk.	Explosive. 1 dairy selling 12 per cent of milk of district contained 85 per cent of 622 cases studied. Cases were found on 11 supply farms. Among 1,848 cows studied 85 were found with mastitis. Pasteurization methods faulty. Cases largely confined to 1 route.	Cases on farms. Mastitis among cows.	J. L. Miller and J. A. Capps, Journal American Medical Association, 1912, vol. 58, pp. 1848-1852.
3	January - Febru- ary, 1912.	Concord, N. H.....	11,000	-----	-----	Milk.....	Explosive. Early cases largely on 1 supply. Epidemic later became prosodemic. Pasteurization not used between Jan. 28 and Feb. 5. Method of contamination not stated. Mainly among children 3 to 5 years of age. Person with sore throat did milking.	Not stated.....	T. A. Mann, N. C. Durham, Journal Infectious Diseases, 1913, vol. 12, p. 481.
4	February, 1912....	Baltimore, Md.....	2,000- 3,000	16	-----	Pasteurized milk, flash.	Explosive. Early cases largely on 1 supply. Epidemic later became prosodemic. Pasteurization not used between Jan. 28 and Feb. 5. Method of contamination not stated. Mainly among children 3 to 5 years of age. Person with sore throat did milking.	.....do.....	L. P. Hamburger, Journal American Medical Association, 1912, vol. 58, pp. 1109-1111.
5	February-March, 1912.	Philadelphia, Pa....	-----	-----	-----	Milk.....	Explosive. 60 to 90 per cent of cases on 1 route supplying 1 to 2 per cent of milk of affected area. Method of contamination of supply not determined.	Case in a milker.....	Journal American Medical Association, 1912, vol. 58, p. 1933.
6	May, 1912.....	Eastern Massachu- setts (Boston, Brookline, Cam- bridge, and Marl- boro).	1,043+	48+	-----	.....do.....	Explosive. Cases traced to milk supplied to 1 boys' boarding house. Outbreak flared up on 2 successive Tuesdays following use of this supply for Sunday ice cream at a girls' dormitory. Girls not eating ice-cream escaped.	Not determined.....	C.-E. A. Winslow, Journal Infectious Diseases, 1912, vol. 10, pp. 73-112.
7	February, 1913....	Middlebury, Vt....	60	1	-----	Ice cream....	Explosive. 70 per cent of cases on 1 route supplying 7 per cent of milk. 2 cows with garget found on dairy. Cultures from these cows gave streptococci—the same organism isolated from several cases.	Not stated.....	Bulletin Vermont State Board of Health, 1914, vol. 14, pp. 25-31.
8	April-May, 1913....	Cortland and Homer, N. Y.	600	14	470	Raw milk...	Explosive. 70 per cent of cases on 1 route supplying 7 per cent of milk. 2 cows with garget found on dairy. Cultures from these cows gave streptococci—the same organism isolated from several cases.	Garget among cows.....	C. E. North, B. White, O. T. Avery, Journal Infectious Diseases 1914, vol. 14, pp. 124-143.

9	do.	Canton, Mass.		13	do.	An extensive outbreak. Nearly all cases on 1 supply. Late in March and early in April 5 cases of tonsillitis occurred in dairy among bottle and milk handlers and in a delivery man. Sale of milk stopped and number of cases immediately diminished.	Cases on dairy	Report Massachusetts State Department of Health, 1913, p. 722.
10	May, 1913.	Norton, Mass.	55		Milk.	Explosive outbreak of tonsillitis and peritonsitis in an institution for young women. Hemolytic streptococci isolated from throats and peritonsal pus of patients and from milk of cows. The human and milk strains showed differences in cultural characteristics and in agglutinative affinities.	Not determined.	Theobald Smith and J. H. Brown, Journal Medical Research, 1914-15, vol. 31, pp. 455-501.
11	January, 1914.	Ray Brook, N. Y.	40	0	Raw milk.	Explosive. Outbreak of tonsillitis in State Hospital for Tuberculosis. Case of sore throat had occurred in a milker on 1 of supply farms. Outbreak ceased promptly following Pasteurization.	Case in a milker	H. A. Bray, Journal American Medical Association, 1915, vol. 64, pp. 1127-1130.
12	February-March, 1914.	Wakefield and Stoneham, Mass.	1,000		do.	Of 209 cases investigated, 203 were on 1 route. Case had occurred at farm early in February in a milker. Wife of dairy man ill on Feb. 25. These people restricted from handling milk. Pasteurization instituted Mar. 4 and outbreak promptly ceased.	Cases on dairy	F. L. Morse, American Journal Public Health, 1914, vol. 4, p. 506.
13	February, 1914.	Elmhurst, Ill.	30		do.	Cases on 1 route. Hemolytic streptococci isolated from milk which closely resembled throat cultures in morphological and cultural characteristics and were indistinguishable after animal passage. Certain of these milk strains were pathogenic for guinea pigs. Milk Pasteurized and outbreak ceased.	Streptococci in milk. Source not stated.	E. C. Rosenow and V. H. Moon, Journal Infectious Diseases, 1915, vol. 17, pp. 69-71.
14	April-June, 1914.	Dutchess County, N. Y.	282		do.	Outbreak attributed to a dairy where an at first unrecognized case of scarlet fever occurred in family of a milker. These cases reported as septic sore throat may have been atypical scarlet fever.	Sore throat in family of a milker.	Report New York State Department of Health, 1915, vol. 1, p. 103; also F. M. Meader, Monthly Bulletin New York State Department of Health, 1915, vol. 10, p. 271.
15	May, 1914.	Westfield, Mass.	129		Milk.	Explosive. Cases largely on 1 route. Case found in milker and milk handler on 1 of supply farms who worked during his attack.	Case in milker	Report Massachusetts State Department of Health, 1914, p. 688.

<sup>1</sup> Estimated.

TABLE 13.—*Septic sore throat*—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
16	June, 1914.....	Rockville Center, N. Y.	232+	-----	205	Raw milk....	80 per cent of 232 cases investigated were on 1 route supplying 25 per cent of milk. Streptococci from throats of cases and from udder of 1 cow were similar cultur-ally and by agglutination. This cow gave no evidence of mastitis. Condi-tions at farm corrected and outbreak stopped.	From udder of 1 cow...	F. Overton, C. Krum-wieda, and A. D. Jacques, Monthly Bulletin New York State Department of Health, 1914, vol. 9, pp. 230-233.
17	July, 1914.....	Winthrop, Mass.....	60	-----	-----	do.....	Cases nearly all on 1 route. Cow found with abscess of the udder; her milk being mixed with rest of dairy product. Sale of milk stopped and outbreak ended.	Abscess of udder in 1 of dairy cows.	Report Massachusetts State Department of Health, 1914, p. 688.
18	August, 1914.....	Easthampton, N. Y....	46	-----	46	do.....	Cases on 1 supply. Milker ill and off duty Aug. 4 but denied sore throat. Returned to duty Aug. 7. On Aug. 12 his throat was cultured and gave almost pure culture of hemolytic streptococci. First case on route Aug. 6. Pasteuriza-tion followed by cessation of outbreak.	Milker a carrier.....	F. Overton, Monthly Bulletin New York State Department of Health, 1914, vol. 9, pp. 370-371.
19	1914.....	Carbondale, Ill.....	-----	-----	-----	Milk.....	Infected milk.....	Not stated.....	Journal American Medical Association, 1914, vol. 63, p. 1401.
20	January-Febru- ary, 1915.	Dorchester, Mass....	17	0	17	Pasteurized milk.	Outbreak at boarding school. Beta hemo-lytic streptococci isolated from cases and from the udders of 2 cows. Milk insufficiently Pasteurized by heating 5-gallon cans in a vat of water heated to 170° F. for 20 minutes.	Cows with infected udders.	W. G. Smillie, Journal of Infectious Dis-eases, 1917, vol. 20, p. 54.
21	March-April, 1915.	Milton, Mass.....	227	-----	233	Raw milk....	Cases on 1 route. 2 cases sore throat found on a supply farm; also 1 cow with garget and 1 cow with pus in milk.	Cases on farm; cows with garget and pus in milk.	E. R. Kelley, Ameri-can Journal of Pub-lic Health, 1920, vol. 10, p. 71.
22	April-May, 1915..	Dorchester, Mass....	227	-----	233	do.....	90 per cent of cases on 1 route. Beta hemo-lytic streptococci isolated from cases, from dairymen, and from milk. A cow on 1 of supply farms possibly contami-nated by a scarlet fever case, but this is not proved.	Cases on supply farms.	W. G. Smillie, Journal of Infectious Dis-eases, 1917, vol. 20, pp. 45-54.

23	May, 1916.....	Watertown, Mass.....	46	.....do.....	Cases on 1 route; carriers with hemolytic streptococci in throat found on farm. Cow on dairy with same organism in one quarter of udder.	Carrier on farm. Cow with infected udder.	E. R. Kelley, American Journal of Public Health, 1920, vol. 11, p. 71.
24	.....do.....	West Winfield, N. Y.....	86	.....do.....	Explosive. Cases among users of milk and cream from 1 dairy. Mild case in milker who continued at his work. Cows examined but pronounced O. K.	Mild case on dairy.....	J. E. Clark, Monthly Bulletin New York Department of Health, 1916, Vol. 11, pp. 44-46.
25	June, 1916.....	Bridgeport, Conn.....	400	.....do.....	90 per cent of cases on 1 route. Severe case in bottle handler at beginning of outbreak. 2 cases on dairy later. Milk supply stopped and outbreak ceased.	Case in bottle handler.....	Monthly Bulletin of Connecticut Board of Health, July, 1916, vol. 3, p. 12.
26	January-March, 1917.	Needham and Newton, Mass.	150	Milk.....	2 milkers with hemolytic streptococci in throats. Streptococci in one quarter of udder of cow.	Streptococci in throats of milkers and in milk from 1 cow.	E. R. Kelley, American Journal of Public Health, 1920, vol. 10, p. 71.
27	February, 1917.....	Dedham and Brookline, Mass.	125	.....do.....	3 cases on dairy.....	Not proved.....	Do.
28	.....do.....	Boston, Mass.....	.....	Raw milk.....	1 cow from 112 showed streptococci from 1 teat. Several milkers carried indistinguishable organisms in their throats.	Streptococci in milk from 1 cow and in throats of several milkers.	J. H. Brown and M. L. Orcutt, Journal Experimental Medicine, vol. 31, 1920, pp. 49-70.
29	February-March, 1917.	Galesville, Wis.....	325	Milk and ice cream.....	Explosive. Cases largely among users of milk or ice cream from 1 dairy. Severe case in dairymaid; onset Jan. 28. Several carriers found on farm. Identical streptococci isolated from carriers and milk. 6 cows found with streptococci in milk—3 of them with mastitis.	Case on farm. Streptococci in milk of 6 cows; several carriers on farm.	G. W. Henika and I. F. Thompson, Journal American Medical Association, 1917, vol. 68, p. 1307.
30	April, 1917.....	Somerville and Medford, Mass.	150	Pasteurized milk.....	A milk handler with hemolytic streptococci in throat ill on farm.	Case on farm.....	E. R. Kelley, American Journal of Public Health, 1920, vol. 10, p. 71.
31	April-May, 1917..	Gloucester, Mass.....	150	Milk.....	Cases on 1 route. Housewife on a supply farm had hemolytic streptococci in throat.	.....do.....	Do.
32	July-August, 1917.	Wellesley, Natick and Dover, Mass.	119	.....do.....	2 milk handlers on dairy with hemolytic streptococci in throats.	Hemolytic streptococci in throats of 2 milk handlers.	Journal American Medical Association, 1917, vol. 68, p. 789.
33	1917.....	St. Albans, Vt.....	1,200	.....do.....	Believed to be due to handling of milk by infected persons.	Believed due to infected persons handling milk.	E. R. Kelley and W. G. Webber, American Journal of Public Health, 1924, vol. 14, pp. 963-966.
34	June-July, 1920.....	Winchester, Mass.....	43	.....do.....	Carrier in a milk handler.....	Carrier.....	

1 Estimated.

TABLE 13.—*Septic sore throat*—Continued

Number of outbreak	Date	Locality	Number of cases	Number of deaths	Number of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of infection	Reference
35	March, 1922.....	Portland, Oreg.....	487	22	487	Raw milk....	Cases on 1 route supplying 1,400 people. A cow with caked udder found with 10,000,000 hemolytic streptococci per cubic centimeter in milk from 1 teat. The organisms were similar to those from cases and were virulent for white mice and rabbits. 1 case with same organism found on farm. Milk Pasteurized and outbreak ceased.	Hemolytic streptococci in milk from 1 cow. Case on farm.	R. L. Benson and H. J. Sears, Journal American Medical Association, 1923, vol. 80, pp. 1608-1612.
36	May, 1923.....	Arlington, Mass.....	68			Milk.....	Case in family of producer.....	Active case.....	E. R. Kelley and W. G. Webber, American Journal Public Health, 1924, vol. 14, pp. 963-966.
37	July, 1923.....	Health Officer Laidlaw's district, New York.....	13		13	do.....	Cases on 1 route selling 200-280 quarts daily. First case of series occurred on dairy in a person bottling milk.	Case in bottler.....	Health News, New York State Department of Health, 1923, vol. 18, pp. 367-368.
38	October, 1923.....	Harwich, Mass.....	7			do.....	Case in family of producer.....	Active case.....	E. R. Kelley and W. G. Webber, American Journal Public Health, 1924, vol. 14, pp. 963-966.
39	July, 1924.....	Danbury, Conn.....	89		52	Raw milk....	Among 89 investigated cases, 52 were on a route selling 500 quarts. All other dairies combined averaged 2.3 cases per 500 quarts. Milker in dairy had sore throat—gargery cow in herd.	Case in milker; gargery cow on farm.	Report State Department of Health, Connecticut, 1925, p. 123-132.
40	September, 1925.....	Logan, Ohio.....	70			do.....	66 cases on 1 milk route.....	Not stated.....	Journal American Medical Association, 1925, vol. 85, p. 833.
41	August, 1926.....	Guilford, Conn.....	220	5		do.....	Explosive, traced to milk. Milk excluded and no more primary cases developed.	do.....	Health Monthly Bulletin, New Haven Department of Health, 1926, vol. 53, p. 2.
42	September, 1926.....	Towns south of Guilford and New Haven.....	80			Certified Milk.	Case ill on farm for 1 week before going to hospital. 34 cases in New Haven among users of 200 quarts this milk daily. Pasteurization checked outbreak.	Case on farm.....	Do.

\* Investigated.

TABLE 14.—Scarlet fever

Num-ber of out-break	Date	Locality	Num-ber of cases	Num-ber of deaths	Num-ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of infection	Reference
1	December, 1906, to February 1907.	Evanston, Ill.	256	—	—	Milk	Explosive. Many adults attacked, 97 per cent of cases on 1 route supplying one-seventh of milk. Several cases found on farms supplying distributor and 1 case found capping bottles.	Cases on supply farm and in bottle capper.	H. B. Hemenway, Journal American Medical Association 1908, vol. 50, pp. 1115-1121.
2	January-March, 1907.	Gardner, Mass.	69	—	69	do.	Cases on 18 routes which secured a portion of milk from 1 producing farm. Certain bottles returned by families where cases occurred refilled without washing. 2 cases developed Feb. 19 on producing farm.	Exchange of bottles—cases on producing farm.	Report Massachusetts State Department of Health, 1907, pp. 500-501.
3	1907	Chicago, Ill.	295	—	—	do.	In part attributed to contaminated milk bottles and to handling of milk by infected persons.	Handling of milk and bottles by infected persons.	Journal American Medical Association, 1907, vol. 48, p. 427.
4	May, 1908	Chilcopee, Mass.	236	—	—	do.	Cases occurred throughout year. 2 children of milkman found to have the disease. "Stopping supply stopped steady occurrence of cases."	Cases on dairy	Report special milk board, Massachusetts Department of Health, 1916, p. 29.
5	May-June, 1908	Springfield Township, N. J.	10	—	10	do.	Cases on 1 route, contact excluded. Unrecognized case on dairy milked, washed utensils and filled bottles while ill. Second case occurred on dairy. Sale of milk stopped and outbreak ceased.	Case on dairy in milkers and milk handlers.	Report New Jersey State Department of Health, 1908, pp. 135-156.
6	July, 1908	Collingswood, N. J.	16	—	16	Raw milk	Cases on 1 route selling 170 quarts daily, largely among milk drinkers. No cases on dairy or supply farms. Outbreak attributed to bottles returned from undiagnosed case found among patrons. Proper sterilization of bottles promptly checked outbreak.	Exchange of bottles	H. B. Wood, New Jersey Medical Journal, 1906, vol. 88, p. 1179.
7	April, 1910	Gardner, Mass.	69	—	—	Milk	Cases largely on 1 supply. Bottles not properly sterilized. Cases occurred on dairy and sale of milk stopped.	Probably exchange of bottles.	Report special milk board, Massachusetts Department of Health, 1916, p. 254.
8	do.	Boston, Mass., and vicinity.	842	—	673	Raw milk	673 cases on 1 large route. Case found on producing farm. Milk Pasteurized and outbreak stopped.	Case on producing farm.	Report special milk board, Massachusetts Department of Health, 1916, p. 254.
9	May, 1910	Pottsgrove, Pa.	16	—	16	Milk	Cases on 1 route. Cases in dairyman's family; milk was sold in violation of quarantine.	Cases on supply farm.	Journal American Medical Association, 1910, vol. 54, p. 1701.

TABLE 14.—Scarlet fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
10	July, 1911	Westfield, Mass.	31	—	9	Milk	Outbreak among Poles who gave disease to milkman's family. Outbreak only in part due to milk.	Case in dairyman's family.	Massachusetts Department of Health, report special milk board, 1916, p. 254.
11	April, 1912	West Acton, Mass.	15	—	12	do.	Explosive. 12 cases on 1 supply. Mild case found on farm was first of series.	Case on dairy.	Do.
12	September-December, 1912	Lowell, Mass.	800	—	400+	do.	Majority of cases on 1 route. Milk handlers found with streptococic throats. A desquamating case found on supply farm.	Milk handlers and active cases on supply farm.	Do.
13	January, 1913	Amherst, Mass.	25	—	25	Raw milk	Explosive. Outbreak among students who used milk substituted on account of shortage in regular supply. 3 unrecognized cases found on supply farm.	Cases on supply farms.	Do.
14	February, 1913	Zanesville, Ohio.	17	—	17	Milk	All on 1 route, delivering 24 gallons daily. No scarlet fever on dairy or supply farms. Bottles returned from homes before and after quarantine. No proper sterilization.	Exchange of bottles.	Annual Report Ohio State Board of Health, 1913, pp. 736-737.
15	April, May, 1913	Rochester City, Minn.	45	—	45	do.	Explosive. Cases in many families on 1 supply. Cases on farm.	Cases in dairyman's family.	Report Minnesota State Board of Health, 1911-12, p. 267.
16	January, 1914	Stoneham, Mass.	10	—	10	do.	Cases on 1 route. 3 unattended and unreported cases found on dairy.	Cases on dairy.	Report Massachusetts State Board of Health, 1914, p. 687.
17	August, 1914	Albany, N. Y.	117	2	—	do.	Explosive. Cases largely on 1 route, and mostly among women and children. Supply stopped and epidemic ceased. No cases found on dairy or supply farms. Case in invasive stage visited for 1 day in a home receiving and returning bottles to a supply farm.	Exchange of bottles.	O. R. Eichell, Monthly Bulletin, New York Department of Health, 1914, vol. 9, pp. 409-410.
18	October, 1914	Watertown, Mass.	3	—	3	do.	Cases on 1 supply. Wife of milkman had scarlet fever. Supply stopped.	Case on dairy	Massachusetts Department of Health, report special milk board, 1916, p. 254.
19	December, 1914	Methuen, Mass.	9	—	9	do.	Cases on 1 route. Bottles from infected homes redistributed without sterilization.	Exchange of bottles	Do.

20	1914.....	Philadelphia, Pa.....	12	12	do.....	Cases on 1 route. 2 desquamating cases found at work in dairy.	Case on dairy.....	Annual Report Bureau of Health of Philadelphia, 1914, p. 120.
21	January, 1915.....	Detroit, Mich.....	68	68	do.....	Cases on 1 route. Cases found on supply farm. Supply stopped and outbreak promptly subsided.	Case on supply farm.....	Public Health Reports, 1915, vol. 30, p. 491.
22	April-June, 1915..	Dutchess County, N. Y.....	113	13	Raw milk.....	Largely on 1 route. Unrecognized case found in milker's family on supply farm.	do.....	Monthly Bulletin New York State Department of Health, 1915, vol. 10, p. 271.
23	May, 1916.....	Clinton and Lancaster, Mass.....	7	7	Milk.....	Cases on 1 supply. 4 cases on dairy.....	Cases on dairy.....	E. R. Kelley, and S. H. Osborn, American Journal Public Health, 1920, vol. 10, p. 71.
24	January, February, 1917.	Malden, Mass.....	3	3	do.....	Cases on 1 small supply. 2 cases in dairyman's family.	Cases on farm.....	Do.
25	May, 1917.....	Arlington, Mass.....	5	5	do.....	Cases on 1 route. 2 cases found on dairy. 12 cases septic sore throat reported on same route.	do.....	Do.
26	February, March, 1918.	Salem, Ohio.....	85	65	do.....	Explosive. 65 cases on 1 route. Case on dairy early in February. Sale of milk stopped and outbreak declined.	Case on dairy.....	Ohio Journal Public Health, 1918, vol. 9, p. 333.
27	April, 1918.....	Holliston, Mass.....	125	125	do.....	Cases on 1 route. Milker and son had scarlet fever on farm.	Cases on farm.....	E. R. Kelley, and S. H. Osborn, American Journal Public Health, 1920, vol. 10, p. 71.
28	December, 1919 ..	Greenwich and East Portchester, Conn.	20		do.....	"Milk-borne epidemic"	Not stated.....	Report Connecticut State Board of Health, 1919-20, p. 85.
29	1920.....	Providence, R. I.....	29		Pasteurized milk.....	Cases among 1 group of students. Others using milk not infected. Doctor Chapin believed possibly a can of raw milk substituted.	Not determined.....	E. S. Godfrey, Nations Health, 1923, vol. 5, pp. 1-6.
30	April, 1921.....	Williamstown, Mass.....	53		Milk.....	Case in producer's family.....	Case in producer's family.....	E. R. Kelley and W. G. Webber, American Journal Public Health, 1924, vol. 14, p. 966.
31	October, 1921.....	Ossining, N. Y.....	20	20	do.....	Explosive. Cases on 1 route. No other common factor.	Not stated.....	Forty-second Annual Report New York State Department of Health, 1921, p. 80.
32	April, May, 1924..	Helena, Mont.....	55	38	Raw milk.....	38 cases on 1 route, 17 secondary cases. Milker had sore throat 10 days before onset epidemic. Hemolytic streptococci isolated from milk. Sale of milk stopped and outbreak stopped.	Case in a milker.....	Arthur Jordon, Public Health Report, 1924, Vol. 39, pp. 2623-2633.

TABLE 14.—Scarlet fever—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
33	Spring of 1924.....	Buffalo, N. Y.....				Pasteurized milk.	Missed case on a producing farm. Out- break "seemingly due to failure to raise temperature to legally required temperature" of Pasteurization.	Case on farm.....	New York State De- partment of Health Quarterly, April, 1924, p. 37.
34	July, August, 1924.	Flint, Mount Morris, and Goodrich, Mich.	128	3	104	Pasteurized ice cream.	Explosive. High percentage of adult males ill. 81 per cent cases in Lansing had used ice cream from a small factory supplying 9.82 per cent of ice cream of city. The proprietor made ice cream for 3 days while ill of sore throat and had eruption.	Case in factory.....	George H. Ramsey, American Journal Hygiene, 1925, vol. 5, pp. 669-681.
35	Fall of 1924.....	Third class city, New York State.	20		18	Raw milk....	18 cases on 1 route. Boy with sore throat delivered bulk milk about 1 week before outbreak.	Case delivered bulk milk.	Health News, New York State Depart- ment of Health, Nov. 24, 1924, p. 87.
36	December, 1924.....	Bristol, Conn.....	127		98	.....do.....	Explosive. 98 used milk from 1 dairy selling about 300 quarts per day. Driver on route worked while ill of scarlet fever.	Case in a milk-wagon driver.	Weekly Bulletin, De- partment of Health, City of New York, Jan. 17, 1925, p. 18.
37	May, 1925.....	Village in southeast Ohio.	91		90	Milk.....	Explosive. 90 cases on 1 route. Bottles from infected homes refilled for delivery.	Exchange of infected bottles.	Journal American Medical Associa- tion, 1925, vol. 84, p. 1755.
38	1925.....	Netcong, N. J.....	53		53	Raw milk....	Cases on 1 route. 40 per cent over 16 years of age and 16 per cent over 30 years of age.	Not stated.....	Annual Report State Department of Health, New Jersey, 1925, p. 25.
39	1925.....	Binghamton, N. Y....	25		25	Milk.....	Cases on 1 route.....	No source of infection found.	Health News, New York State Depart- ment of Health, June 1, 1925, vol. 2, p. 87.
40	1925.....	.....do.....	19		19	.....do.....	Cases on 1 route; boy who milked and 2 others had scarlet fever on producing farm.	Case in a milker.....	Do.

TABLE 15.—*Diphtheria*

No. of outbreak	Date	Locality	Number of cases	Number of deaths	Number using same milk	Type of milk	Origin and circumstances of outbreak	Probable means of infection	Reference
1	December, 1907-January, 1908	Oroville, Calif.				Raw milk	8 families on 1 route had cases; few escaped. Schools not incriminated. Wife and child of dairyman who handled milk found to be carriers.	Carriers on producing farm.	Report, California State Board of Health, 1906-1908, p. 198.
2	March, 1908	North Tewksbury, Mass.	5		5	Milk	"Investigated and thought to be due to milk infection."	Not stated	Report, special milk board, Massachusetts Department of Health, 1916, p. 253.
3	June, 1908	Ansonia, Conn.	42		42	do	Explosive. Cases on 1 route, 50 per cent adults. One week before outbreak dealer who bottled and distributed milk had "tonsillitis," later found to be a diphtheria carrier. 3 members of his family among earliest cases.	Cases and carrier in distributor's family.	Report of Connecticut State Board of Health, 1907-8, p. 43.
4	April, 1910	Lewiston, Minn.				Butter	Every infected family except 1 used butter from 1 farm. No other common factor. Apr. 13 boy returned to farm following illness with diphtheria at hospital. Brother attacked Apr. 20. Tests by State showed diphtheria bacilli to persist in butter for 1 month under ordinary conditions.	Carrier and case on dairy.	Third Biennial Report, Minnesota State Board of Health, 1909-10, pp. 203-204.
5	November, 1910	Athol, Mass.	16		16	Milk	Cases on 1 route. Milkman the first case of series.	Case in milk man	Report, special milk board, Massachusetts Department of Health, 1916, p. 253.
6	May-June, 1911	Minneapolis, Minn.	75	1	68	do	Explosive. Cases on 1 route. No other common exposure. All users of this milk cultured (231) and 67 found with diphtheria bacilli. 1 of 4 milkers found to be a carrier.	Carrier on farm	Fourth Biennial Report, Minnesota State Board of Health, 1911-1913, pp. 313-314.
7	May, 1912	Northampton, Mass.	11		9	do	9 cases on 1 supply. Dealer's wife who washed utensils and helped in milk room had a mild case.	Cases on dairy	Report, special milk board, Massachusetts Department of Health, 1916, p. 253.
8	1912	Cioce, Pa.	5		5	Raw milk	5 cases in different homes all using milk from 1 dairyman with case in his family.	Case in dairyman's family.	Annual Report, State Commissioner of Health, Pennsylvania, 1912, p. 526.

TABLE 15.—*Diphtheria*—Continued

Num- ber of out- break	Date	Locality	Num- ber of cases	Num- ber of deaths	Num- ber of cases using milk	Type of milk	Origin and circumstances of outbreak	Probable means of in- fection	Reference
9	April-May, 1913	Lincoln, Nebr.	110	2		Milk	Explosive. Primary cases all on 1 route. A milkster at the dairy had a mild unrecognized case, his wife also had disease. Sale of milk stopped and outbreak ceased.	Cases on dairy	H. H. Walte, American Journal Public Health, 1914, vol. 4, p. 418.
10	1913	Tiffin, Ohio	(1)			Raw milk	"Several cases on 1 route." No illness or carriers on distributing farms. Milk from supply farms examined and a bacillus growing and staining like the diphtheria bacillus isolated from 1 source.	Not determined	Report, Ohio State Board of Health, 1913, p. 275.
11	May, 1914	State Hospital, Massillon, Ohio	20	4	20	do	Explosive. Cases on 1 supply. No other common exposure. Several mild cases of sore throat on dairy before outbreak. First definite case in a carpenter who worked at the dairy.	Cases on dairy	Report, Ohio State Board of Health, 1914, pp. 743-745.
12	July, 1914	Chicago, Ill.	13		11	Milk	11 cases on 1 supply. Dairyman and 2 helpers gave positive cultures, 1 a bottler.	Carriers on farm	Report, City of Chicago Department of Health, 1911-1918, p. 1015.
13	May-June, 1915	Suffern and Ramapo, N. Y.	41		33	"B" milk, raw.	Explosive. 33 primary cases and 21 carriers found on 1 route. 1 clinical case and 5 carriers found on farm.	Case and carriers on farm.	W. J. Denno, Monthly Bulletin, New York State Department of Health, 1915, vol. 10, pp. 274-276.
14	September, 1915	Holbrook and Brookton, Mass.	27		27	Milk	Explosive. Cases on 1 route. 5 carriers found on producing farm.	Carriers on farm	Report, special milk board, Massachusetts State Department of Health, 1916, p. 283.
15	October, 1915	Wellesley, Mass.	3		3	do	Active case found on premises of milk dealer.	Case on premises of milk dealer.	E. R. Kelley, American Journal Public Health, 1920, vol. 10, p. 70.
16	January, 1916	Middletown, N. Y.	12		12	Raw milk	Cases on 1 route, mainly among women. 4 carriers located on farm. Boiling of milk stopped outbreak.	Carriers on farm	Report, New York State Board of Health, 1916, vol. 1, p. 70.

17	April, 1916	Essex, Vt.	26	Milk	Cases on 1 route. A case released on 2 negative cultures returned to milking. After onset of epidemic his culture was found to be positive.	Milker a carrier	Vermont Board of Health Bulletin, 1916, vol. 17, No. 2, p. 27.
18	July, 1916	Charlottesville, Va.	15	0	Pasteurized milk.	Bottle capper's wife a carrier.	W. E. Bray, Virginia Medical Monthly, January, 1922, vol. 48, pp. 592-593.
19	July-August, 1917	Newport, R. I., and vicinity.	402	0	Ice cream	Cases and carriers on supply farm.	Public Health Reports, 1917, vol. 32, pp. 1787-1804.
20	August, 1920	Williamstown, Mass.	33	31	Raw milk	Finger of milker infected with <i>B. diphteriz</i> .	J. E. Henry, Journal American Medical Association, 1920, vol. 75, p. 1715.
21	September, 1920	do	14	14	Milk	Finger of milker and teat of cow infected with <i>B. diphteriz</i> .	Do.
22	1920	Westchester County, N. Y.			Certified raw milk	Carriers on farm	Annual Report New York State Department of Health, 1920, vol. 1, p. 4.
23	April, 1921	Winchester, Mass.	8		Milk	Not proved.	E. E. Kelly and W. G. Weber, American Journal of Public Health, 1924, vol. 14, pp. 983-996.
24	February-April, 1922	Austin, Tex.	71	52	do	Milker a carrier	M. G. Mason and E. H. Golas, Journal American Medical Association, 1922, vol. 79, p. 1300.
25	October, 1922	Chicago, Ill.	16		do	Carrier on farm	Report of Department of Health, City of Chicago, Ill., 1922, p. 297.
26	1923	Nauvoo, Ill.			do	Not stated	Health News, Illinois State Department of Health, 1924, Vol. X, p. 27.

1 Several.

TABLE 16.—Miscellaneous diseases

No. of outbreak	Date	Locality	Disease	Number of cases	Number of deaths	Number of using milk	Type of milk	Origin and circumstances of outbreak	Probable means of infection	Reference
1	October, 1914.....	New York State.....	Botulism.....	3	3	3	Cottage cheese.	3 persons who ate homemade cottage cheese died. 3 c. c. emulsion of cheese killed guinea pigs. <i>B. botulinus</i> isolated from cheese.	Not stated.....	Mary Nevin and Boris Mann. <i>Report New York State Department of Health</i> , 1915, vol. 3, pp. 306-307.
2	February, March, 1915.	Culver, Ind.....	Appendicitis.....	8	-----	8	Milk, raw	8 cases at Culver Military Academy in 12 days (7 cases balance of year). Green producing streptococci isolated from wall of appendix and tonsils of 2 cases. Culture from appendix gave appendiceal lesions in 3 of 6 rabbits inoculated. Similar organisms isolated from dairy products gave appendiceal lesions in 41 per cent of 22 animals inoculated.	do.....	E. C. Rosenow and S. I. Dunlap. <i>Journal Infectious Diseases</i> , 1916, vol. 18, pp. 383-390.
3	do.....	do.....	Parotitis.....	34	-----	34	do.....	Streptococci isolated from Stano's duct in cases of parotitis and from dairy products caused parotid lesions in 73 and 30 per cent, respectively, of the animals inoculated.	do.....	Do.
4	May, August, 1922.	Phoenix, Ariz.....	Malta fever.....	30	-----	27	do.....	27 cases had used goats' milk from the same source, other 3 may have been infected from same source.	Infected goats.....	G. C. Lake. <i>Public Health Reports</i> , 1922, pp. 2895-2899 (Reprint 801).
5	March, 1924.....	Seneca Falls, N. Y.....	Gastroenteritis.	82	-----	82	Milk.....	Milk from a new supply served at school, 82 out of 132 who drank this milk were ill within 2 hours. Pain in stomach, nausea, vomiting, diarrhea, drowsiness, and prostration. All but 20 able to be at school next day. Cow found on farm with inflamed udder. Milk was off color and gave large numbers of nonhemolytic streptococci.	Cow with infected udder.	Health News, New York State Department of Health Mar. 31, 1924.
6	December, 1924..	Brooklyn, N. Y.....	do.....	94	-----	-----	Cream filler for cake.	94 cases, chills, fever, abdominal pain, vomiting, diarrhea. <i>B. enteritidis</i> isolated from cream filler, and stools from 70 per cent of 94 cases. Stools of baker also positive for <i>B. enteritidis</i> .	<i>B. enteritidis</i> isolated from baker's stools.	W. B. Drennan, <i>Weekly Bulletin</i> , City of New York Department of Health, Mar. 28, 1915, pp. 100-101.

7	March, 1925.....	Bedford, Me.....	.....do.....	9	9	9	Albanian cheese.	Pain in stomach, vomiting, diarrhea. Traced to cheese. Streptococci pathogenic for cats by mouth were the predominating organisms found in the cheese. (Outbreak from imported cheese.)	Not stated.....	B. A. Linden, W. R. Turner, and Chas. Thom, Public Health Reports, 1926, vol. 41, pp. 1647-1652.
8	1925.....	Chester, Pa.....	Denguelike syndrome.	400	.....	.....	Milk, raw.	Cases nearly all on 1 milk route. Cases found on producing farm and among milk handlers. Outbreak probably of a streptococcal nature.	Cases on farm and among milk handlers.	Journal American Medical Association, 1924, vol. 85, p. 365.
9	December, 1925..	Courtland, N. Y....	Polio-myelitis..	9	2	9	.....do.....	Cases on 1 route furnishing 215 of city's 5,700 quarts of milk per day. A milk developed polio Dec. 7, 1925, but continued milking and handling of milk. Cases appeared on route: 1, Dec. 14; 2, Dec. 16; 2, Dec. 18; 1, Dec. 19; and 3, Dec. 25. Social relations between various cases nonexistent or extremely tenuous. No paralysis in any cows.	Case in a milk and milk handler.	Health News, New York State Department of Health, Jan. 18, 1926.
10	January, 1926....	Haverhill, Mass....	Erythema arthriticum epidemicum.	60	0	59	Raw milk.	Cases on one supply. No illness found on supply farms in either persons or cattle. An organism was isolated from blood and joint fluid of several cases.	Not stated.....	E. H. Pace, L. E. Sutton, Jr., and O. Williams, Boston Medical & Surgical Journal, 1926, vol. 194, pp. 285-287.
11	February, 1926....	Saratoga Springs, N. Y.	Nausea and vomiting.	127	.....	127	Milk.	Nausea and vomiting among school children developed about 4 hours after drinking milk and occurred on 2 different days. 2 families apart from school but using same milk also developed cases. Cases all well on day after attack. Cow with infected udder found on farm.	Milk from cow with infected udder.	Health News, New York State Department of Health, Apr. 19, 1926.
12	.....do.....	Kansas City, Kans.	Gastroenteritis.	22	.....	.....	American cheddar cheese.	Nausea, vomiting, abdominal pain and diarrhea. Explosive. Traced to eaters of cheese. Streptococci pathogenic by mouth for cats were the predominating organism found in the cheese.	Not stated.....	B. A. Linden, W. R. Turner, and Chas. Thom, Public Health Reports, 1926, vol. 41, pp. 1647-1652.

